OCTOBER 8, 1951

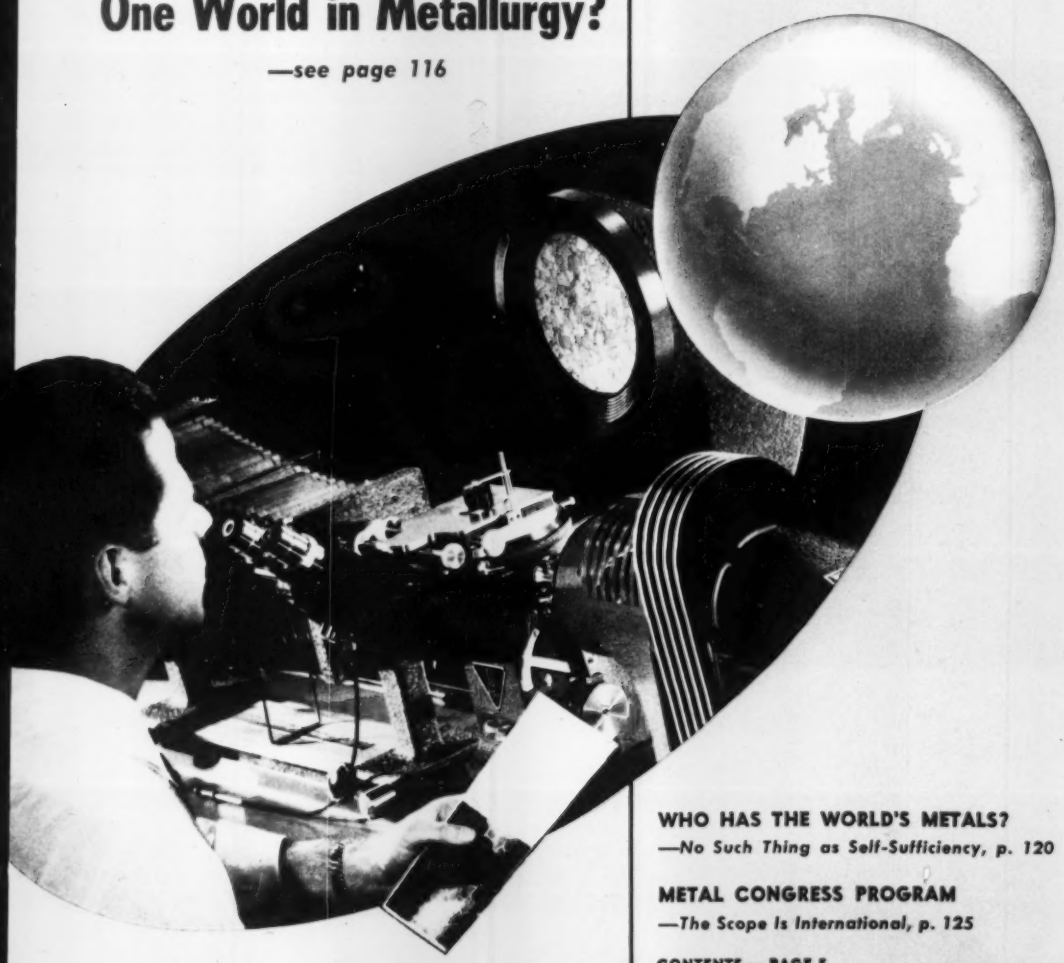
METAL SHOW ISSUE

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

One World in Metallurgy?

—see page 116



WHO HAS THE WORLD'S METALS?
—No Such Thing as Self-Sufficiency, p. 120

METAL CONGRESS PROGRAM
—The Scope Is International, p. 125

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8 *Important Features of* **EC&M** *Magnetic Control*

1 Time-Current Acceleration
2 Line-Arc Contactors
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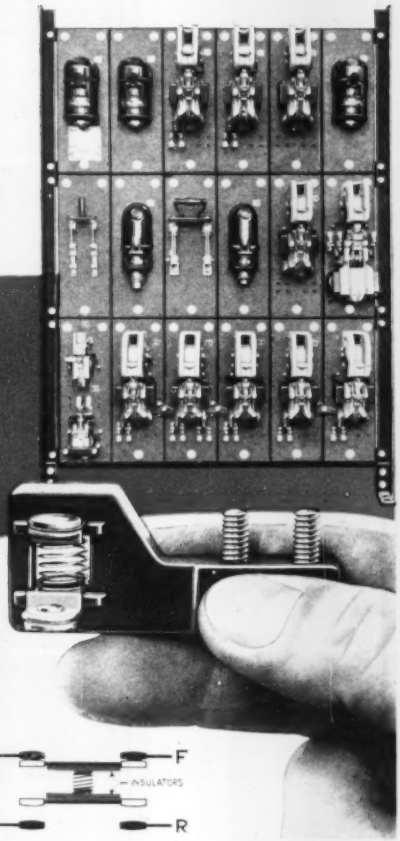
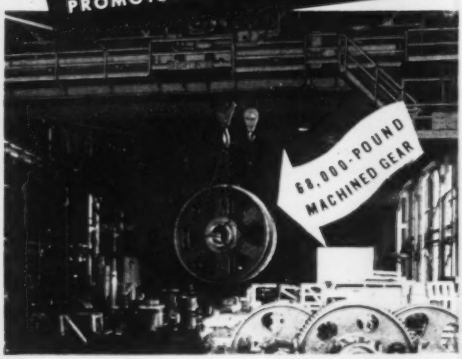
7 Bolted, Welded Frame
8 Quick Contact Renewing



simpler, safer
ELECTRICAL INTERLOCKS
on all EC&M improved
LINE-ARC CONTACTORS

Two sets of double-break contacts—*isolated from each other*—no carry-over from one to the other by an arc.

EFFICIENT INTERLOCKING PROMOTES EFFICIENT OPERATION



These EC&M Electrical Interlocks are unequalled—the movable coin-silver contacts are carried in the window-frame or rectangular slot of the insulator which is attached to the front of the contactor-arm by two screws as shown. These movable contacts engage or bridge the stationary contacts, also of coin-silver.

Note that the moving-contact assembly uses two duplicate bridges, held in position by a common spring. Each bridge is backed up with a combined insulator-spring-retainer—the spring *cannot* conduct current from one bridge to the other.

With these improved interlocks, the n.o. circuit is isolated from the n.c. circuit—interlocking is simple, safe—a good reason for specifying EC&M *LINE-ARC* Contactor Control for cranes and mill auxiliaries.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Our Metallurgists Will Help Solve Your Defense Order Problems

Almost every day some manufacturer comes to us with a new steel problem with which he is confronted in connection with defense contracts. In some cases he needs detailed information on grades or qualities of steel to produce specified results. In others he has questions about sizes of rough stock, processing details, heat-treatment, or machining. Usually our metallurgists are able to come up with the right answer.

If you happen to run into any situation where you need metallurgical advice concerning defense orders, let us know about it. We will do our best to help. And you can rest assured that our advice will be given from an unbiased viewpoint, for we manufacture practically all grades of steel and we have no special products that we are interested in promoting.

This service will cost you nothing; it may prove to be of considerable value.

If you need steel, remember that Bethlehem is a dependable source for all of the AISI alloy grades in addition to the full range of carbon and special steels. For full information, call or write our nearest sales office.

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BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor* - Bethlehem Steel Export Corporation

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Central is a key link in the chain of fifteen Barium Steel Corporation subsidiaries that provide a single, integrated source of supply for steel in many forms . . . plate, structurals, forgings, stampings, springs, bolts, nuts.

These strategically located companies can completely coordinate operation and output to meet all your steel needs. That's why Barium is better able to help you solve your steel problems.

Put Barium's quality-controlled source of supply (from blast furnace to end product) to work for you. Get in touch with Barium Steel Corporation at 25 Broad Street, New York City.

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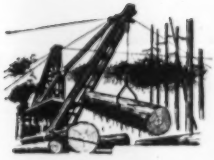
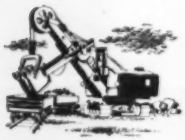


For Logging

For Sand and Gravel

For Aircraft

For Marine

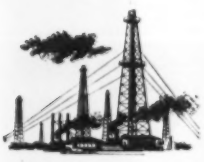


For Stone Quarries

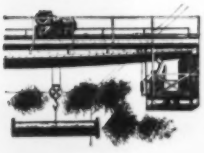
For Construction

For Elevators

For Mining



For Drilling



For Industrial

For better service and more economy

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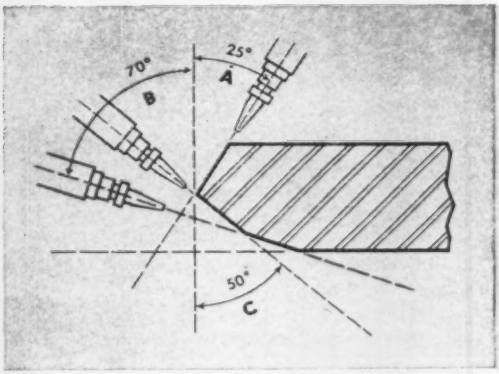
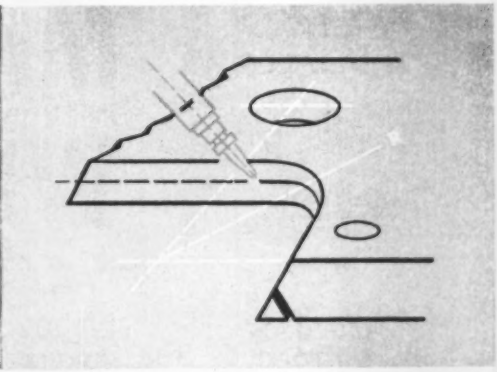
BULLETIN 5025 gives information on "How to order Wire Rope" and lists all sizes and constructions of Improved Plow Steel Monarch Whyte Strand Wire Rope. Copy sent on request.

No more grinding edges like these on *armor plate!*

Now—the Acetogen Process allows you to flame-cut the most difficult bevels on armor plate to exact tolerance—and slash the cost of plate-edge preparation by many dollars per ton.





At last, *precision* flame-cutting of armor plate is a reality! Because of its startling accuracy, versatility, and operating characteristics, the Acetogen Process drastically slashes plate-edge preparation costs!

YOU SAVE MAN HOURS! Intricate bevels and cuts need no longer be slowly ground—they can be quickly flame-cut to ±1/16" tolerance.

YOU SAVE CAPITAL INVESTMENT! You don't need large, expensive grinding machines, or elaborate paraphernalia. The Acetogen Process utilizes standard, readily-available, low-cost equipment and tools.

YOU SAVE TRAINING TIME! Experienced flame-cutters become qualified Acetogen operators within a few days. Novices learn quicker, too, because Acetogen gas is docile, easy to use, dependable.

YOU SAVE FLOOR SPACE! You don't need a whole department devoted to grinding. The *complete* job is done in your Acetogen-cutting department.

YOU SAVE HANDLING COSTS! No need to move heavy plates from cutter to grinder; Acetogen does the job in *one* department, and with little moving of plates.

The most convincing proof of these statements comes from some of the nation's top companies—Henry Disston & Sons, Inc.; Baldwin-Lima-Hamilton Corporation; Fitzgibbons Boiler Co., Inc. These companies have continually been amazed at the speed, precision, *and economy* of the Acetogen Process.

Why not put Acetogen to work cutting *your* armor plate? We will act either as consultants, or as sub-contractors doing the entire job in your plant. *We invite your inquiry.* Acetogen Fabricators, Inc., 822 Commercial Trust Bldg., Philadelphia 2, Pa.

YOU GET THESE SPECIAL BENEFITS ONLY WITH THE ACETOGEN PROCESS

- Armor plate of all thicknesses flame-cut to ±1/16" tolerance!
- Acetogen-cut plates are ready for welding without costly grinding, finishing, bridging, or beading!
- Single- and multi-bevels are as easy to flame-cut as square-edges!
- Acetogen-cut plates have "feather" edges . . . surfaces have sufficiently low Brinell to allow machining.

ACETOGEN FABRICATORS, INC. *Originators of precision flame-cutting*

STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 15 OCTOBER 8, 1951

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Next Week ... **Boron Engineering Steels ... Big Space Savings Realized in Brazed Aluminum Heat Exchangers ... Practical Heat Treatment Stress Relieves Stampings ... Faster Mill Speeds Increase Rolling Capacity**

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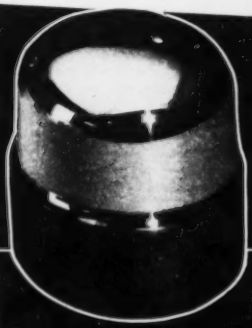

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✓ CARBIDES
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You can reduce finishing and polishing time in your shop—and get mirror finishes every time—with DYMO FINISHING. Elgin DYMO Diamond Compound . . . containing pure, Elgin graded diamond . . . comes ready to use, minimizes waste and cuts faster. Write today for free demonstration—proof of DYMO FINISHING advantages.

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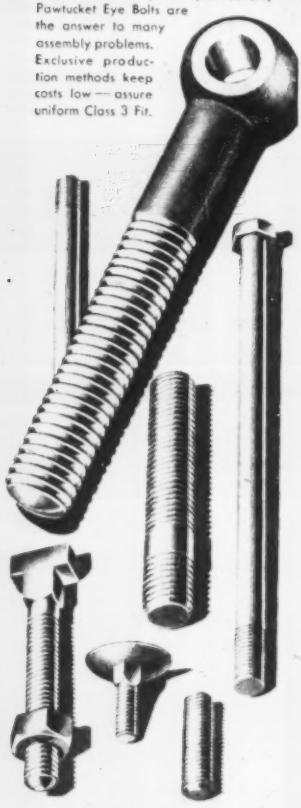

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS

T.M. REG.

Behind the Scenes . . .

Fanfare

Sound the trumpets! This is STEEL's One World issue, to mark the World Metallurgical Congress and the American Society for Metal's annual show, to be held jointly in Detroit Oct. 15-19.

The editors have been burning the midnight oil for weeks, travelling all over the country to put together some unique information. One article is on One World in Metallurgy beginning on p. 116. That gives an analysis of metallurgical problems faced in foreign countries and was gathered from interviews by the editors with foreign metallurgists.

Beginning on p. 120 appears another piece de resistance, an analysis of who has the world's metals, worked up by Managing Editor Walt Campbell. Listed to the east of here is a metal-by-metal scoreboard showing which area of the globe has the most, the Communist or free world.

The cover on this issue is something special, too, because it contains a photograph of one of the most modern tools to help the metallurgist. It's the picture of a Magna-Viewer being used for grain size determination on the Bausch & Lomb Balphot Metallograph.

Speaking of the first-rate photos we've been getting for our covers, did you note the honey we had of an electric motor on the Sept. 17 cover? It was a picture of a Westinghouse unit.

Capitalist

We were haunting the halls of the editorial precincts the other night in search of news for the column. And we found it—in the person of Geraldine, our night editor who doubles in brass as cleaning woman on the building staff. She didn't notice our approach because she was so absorbed in the Dow-Jones stock-news ticker, which flashes business news to our editors from all parts of the world.

"Aha!" we shouted gaily. She almost jumped a foot. "Investing your idle funds in the stock market, eh?"

"Not stocks, numbers." She looked us haughtily in the eye. "I'm checking for a friend."

Mythology

Our classical education was sadly neglected in our youth, so we only found out last week that Vulcan is the god of metalworking. Now that we know it, we're wondering what to do with it. Since we're the Magazine of Metalworking, we ought to be able now to weave a neatly turned classical illusion, but we've used up a whole page of copy paper with experimental phrases. Alas, all the allusions turn out to be illusions, and not at all neat.

Generated in Washington

A little item appeared in last week's Windows of Washington section that deserves further comment. It concerned a Department of Interior scheme to install equipment on top of windy hills that would generate electricity for power-short areas. Is there any electricity scarcity near Capitol Hill in Washington?

Ringer

We have—or rather up until a few days ago we thought we had—a precise idea of who was in STEEL's reading audience. We got a surprise, though, when reprint orders began pouring in for the story on conventions and how to attend them that we ran in our Sept. 3 issue. Among those requesting reprints were the Milk Industry Foundation and the National Potato Chip Institute.

Puzzle Corner

We explained last week that the puzzle in the Sept. 24 issue was to find the puzzle. Because of a complicated chain of circumstances that we won't go into here, we inadvertently left it out. So, to make up for our oversight we're giving you two especially tricky ones this time.

A man six feet tall, stands six feet from a vertical plane mirror. What is the height of the smallest mirror in which he can see his entire image?

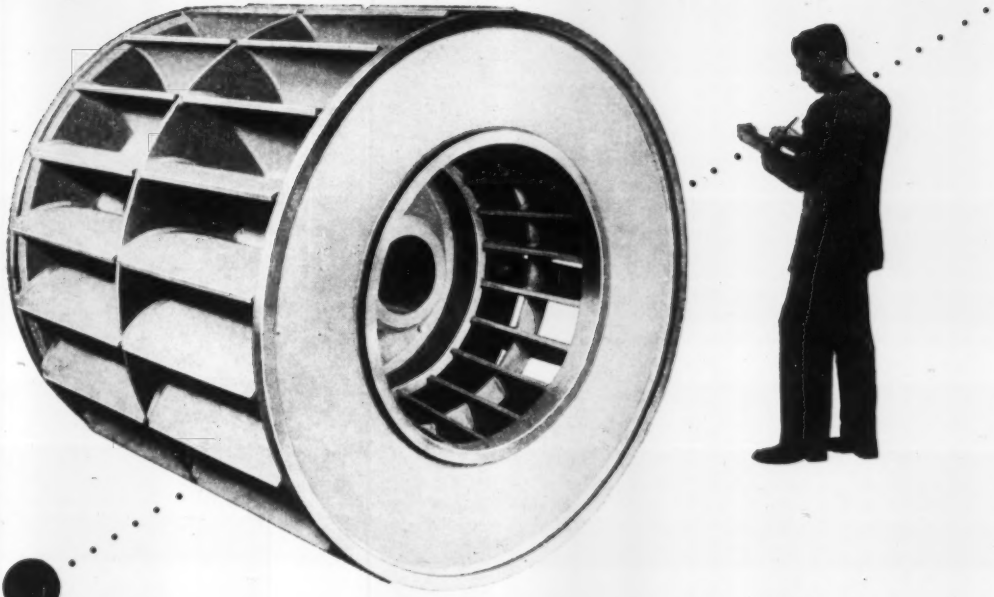
If the same man is twelve feet from the mirror, what would be the effect on the size of the mirror?

Here's the other:

Two pre-war wine merchants entered Paris, one of them with 64 casks of wine, the other with 20. Not having enough money to pay the customs duties, the first paid 5 casks of wine and 40 francs, and the second paid 2 casks of wine and received 40 francs in change. What was the price of each cask and the duty on it?

Shrdlu

(Metalworking Outlook—Page 79)



Leading manufacturers specify ACME *welded* fabrication

FOR BASES, ASSEMBLIES, COMPONENT PARTS

One leading manufacturer, who makes vacuum pumps, specifies Acme welded fabrication for intricate, giant-size pump rotors like the one shown above. Like other manufacturers throughout industry, he relies on the skill, ingenuity, and experience of Acme engineers to meet his unusual and difficult fabricating requirements exactly. He also relies on Acme's extensive forming, flame-cutting, and machining facilities to eliminate sub-contractors and cut production costs.

You too can share the advantages of welded fabrication, the economy of complete facilities under one roof, the convenience of adherence to your delivery schedules . . . write Acme today.

Send us your blue prints or a rough sketch . . . you'll receive a prompt quotation.

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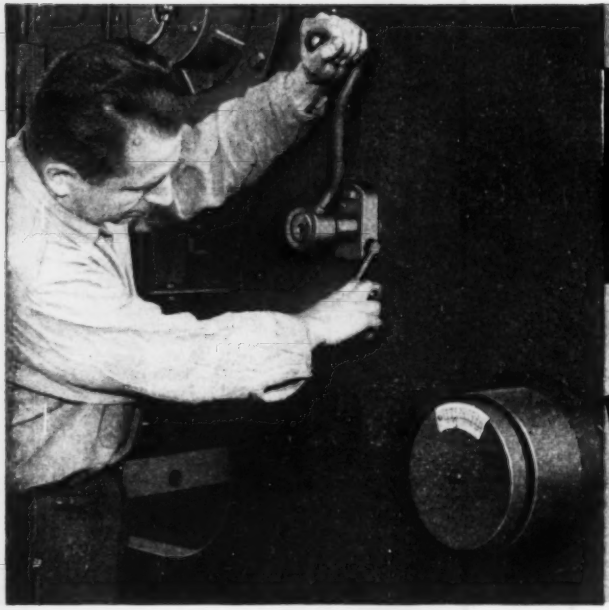
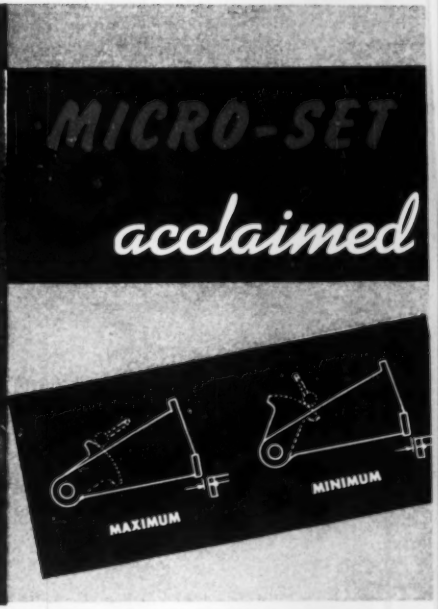




KNIVES REMAIN SHARPER LONGER BECAUSE OF MICRO-SET

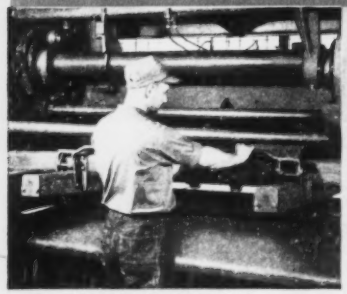
From coast to coast Steelweld Shear users are acclaiming Steelweld's MICRO-SET knife adjustment. There's nothing like it available on any other shear—at any price. It's the greatest development in shear design made in decades.

As every shear user knows, there is a direct relation between the thickness of plate cut and the clearance between knives for most satisfactory results. But heretofore, because of tedious time-consuming work required to change knife clearance, most shear operators seldom adjusted the clearance unless there was a great variation in the thickness of plates being cut. Despite the advantages resulting, they could not afford the time required to adjust the knives to proper clearance.

Steelweld's MICRO-SET makes knife adjustment f[a]st and easy. Merely turn a crank and watch a dial. That's all there is to it. In a jiffy the indicator is on the proper figure and the machine is ready to go. No bolts to loosen! No bed to move! No feeler gauges required! The large easily-read dial indicates the clearance between knives in thousandths of an inch and also shows the plate thickness that may be cut with any knife setting.

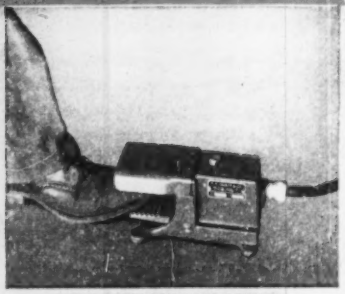
Because of simple MICRO-SET knife adjustment, every cut made on Steelweld Shears is the best possible cut—straight, smooth, accurate. And of importance, KNIVES REMAIN SHARPER, LONGER.

A FEW OF MANY OTHER *Production Speeding* FEATURES



LIFT-UP BACK GAUGE

Lift-up back gauge can be raised out of way to allow long sheets to pass through by easy movement of horizontal bar. No time need be spent detaching or removing back gauge. Standard feature on ¾ inch capacity shears and larger.



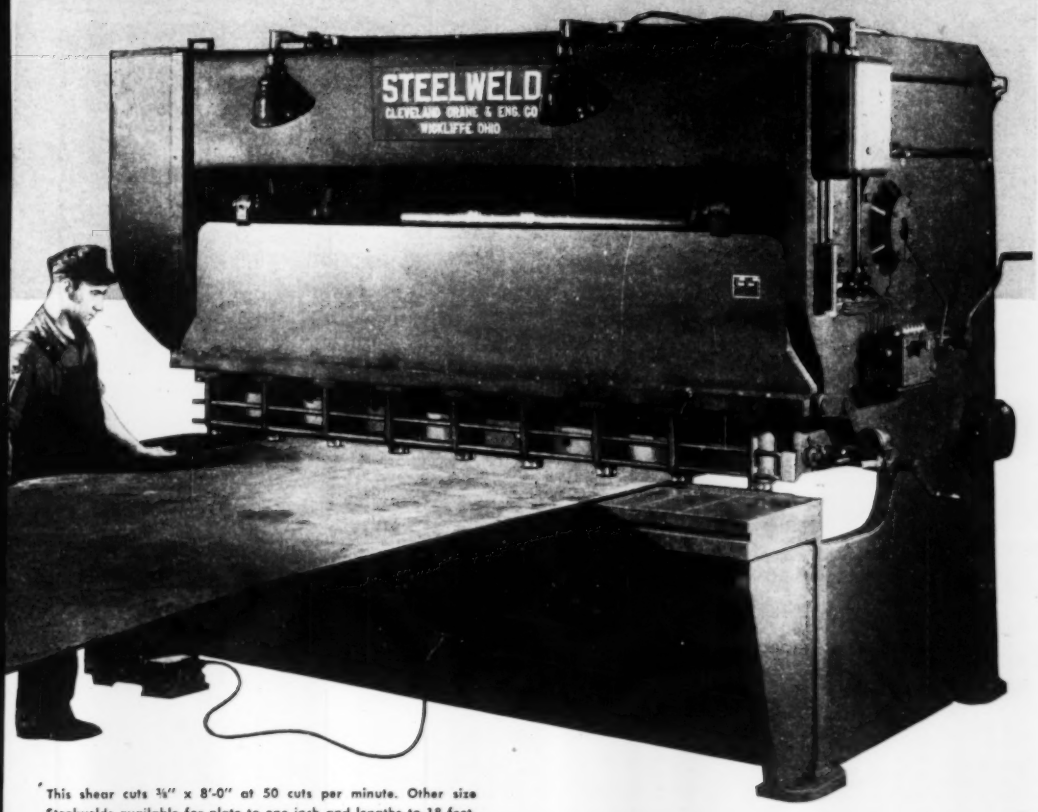
FATIGUE-REDUCING FOOT CONTROL

Convenient electric foot-switch operation is standard for all Steelweld Pivoted-Blade Shears. The switch can be moved around floor to wherever handiest. Eliminates tiresome leg lifting ordinarily required.

STEP-SAVING GAUGE ADJUSTMENT

Steelweld design eliminates need of many steps around machine to adjust hand-operated back gauge at rear. Adjustment crank is quickly reached at right end near front. When required, power-driven gauges can be furnished.

KNIFE ADJUSTMENT
by STEELWELD SHEAR USERS



This shear cuts ¾" x 8'-0" at 50 cuts per minute. Other size Steelwelds available for plate to one inch and lengths to 18 feet.

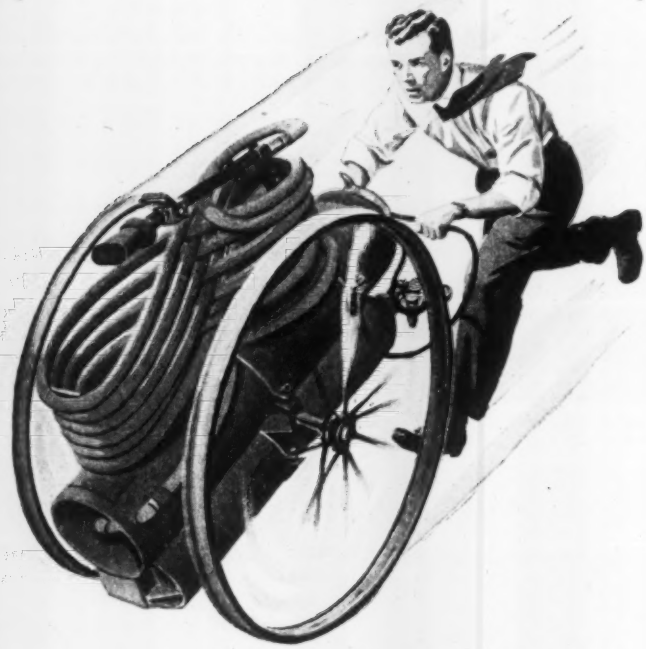
GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7818 East 282nd St. Wickliffe, Ohio.

STEELWELD PIVOTED BLADE SHEARS



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The new "instant flow" hand control enables you to beat back fire with a long range "straight" stream...or to blanket the fire completely by the wider coverage of the improved "fan" pattern.

One man can wheel this extinguisher through a standard doorway...apply 150 pounds of fire-smothering dry chemical in less than one minute.

Write for full information on this new Kidde dry chemical extinguisher...or the full line of Kidde extinguishers and built-in systems.

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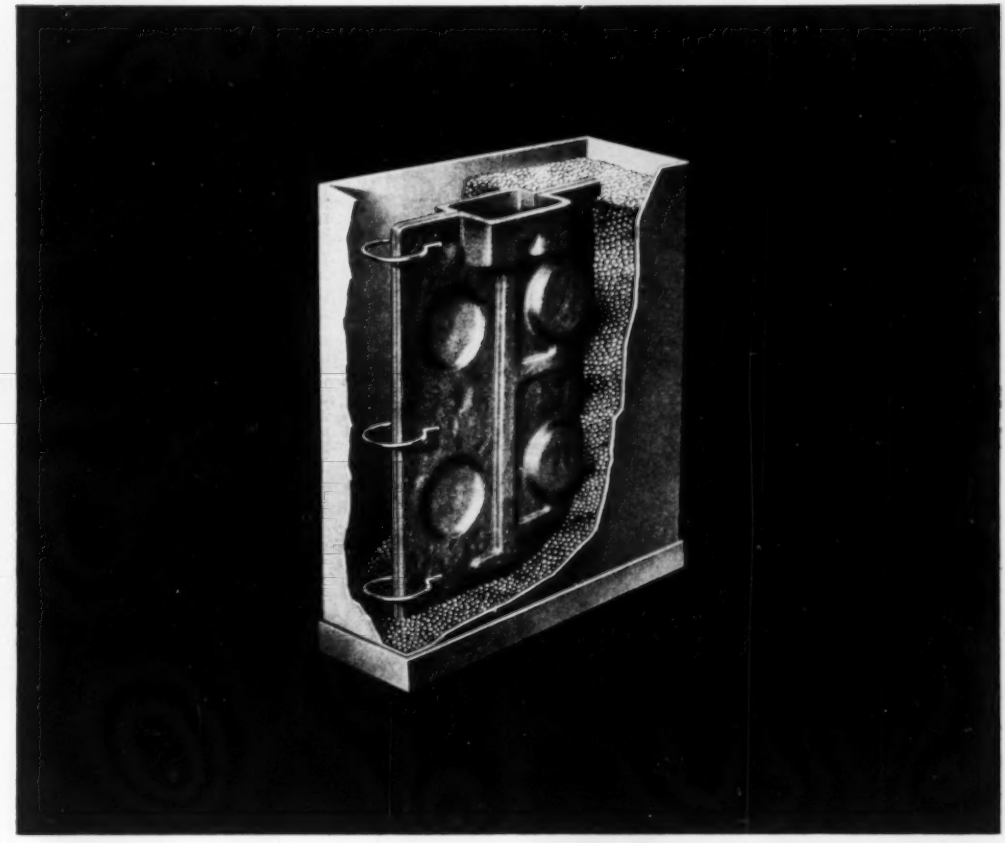

HOW CASTINGS CAN CUT YOUR COSTS!

Pictured here is a thin-shell sand mold, backed with steel shot for reinforcement and heat dissipation as foundry metal is poured.

This sample mold is produced by the shell molding process which is currently used to produce a great variety of ferrous and non-ferrous castings with extremely fine detail, almost pattern-smooth surfaces, and tolerances as close as .002 to .005 of an inch per inch.

How can this process help you? By producing castings closer to desired dimensions and with smoother surfaces, reducing costly machining and finishing operations.

Your foundrymen know about these money-saving, metal-conserving thin-shell sand molds and cores. Consult with them before your plans reach the blueprint stage.

These sand molds and cores are bonded with BAKELITE Phenolic Resins. The process, properly applied to your needs, can be of great benefit to you. It speeds output, lowers manufacturing costs, and is capable of breaking many a production bottleneck.

Let us give you more information. Write Dept. CN-43.

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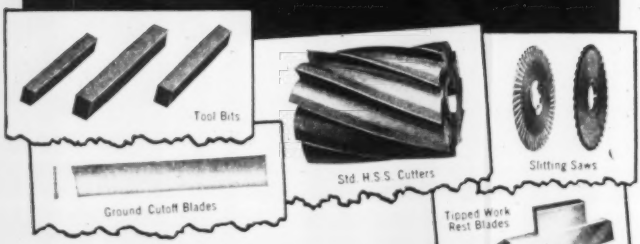

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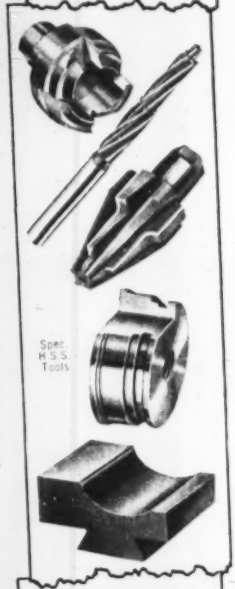
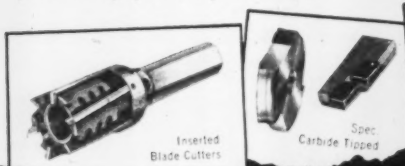


Are you responsible for purchase or specification of cutting tools —or wear and abrasion-resistant parts? You'll find the *Gorham* Tool Catalog a *helpful time saver!* 120 pages, packed with useful information, describe and illustrate the complete *Gorham* line—*PLUS* an informative section of Engineering Data. Request your free copy on company letterhead.

We also offer the service of *Gorham* field engineers, whose counsel in specification and design for special tooling problems is yours for the asking. Their recommendations are backed by *Gorham's* 25-year background in tool design, manufacture and heat treatment. Write for the name of your nearby *Gorham* representative.



Gorham
TOOL COMPANY
14401 WOODROW WILSON
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LETTERS
TO THE EDITORS

AMS 5385

In the article appearing Aug. 27, entitled "Research Pushed on Gas Turbine Blade Materials," the text makes reference several times to the name Vitallium. Use in this connection is improper because the trademark Vitallium was registered by us many years ago in the U. S. patent office, as well as in many other countries for use on cast dental and surgical appliances manufactured by Austenal, and on cast dental appliances manufactured under license from Austenal and made from a special cobalt-chromium alloy developed for those special applications, and tested, approved and obtained from Austenal. The name should not be applied to any alloy that is used for industrial purposes.

While it is a fact that certain types of turbine buckets for use in aircraft have been manufactured from a cobalt-chromium alloy which is fairly closely related to the types of alloys developed and used for cast dental and surgical appliances, it is by no means the same in physical properties and characteristics such as are required in these appliances.

We therefore ask that in order to safeguard the patients, as well as the dental and surgical professions, and in order to prevent serious injury to our trademark rights, that you refrain in the future from using the name Vitallium in connection with any articles or releases relating to industrial alloys. You will have no difficulty in designating the type of alloy such as mentioned in the article by means of the specification AMS 5385.

Grace Masson
Austenal Laboratories Inc.
New York

● STEEL *regrets any injury to trademark rights, patients, dental or surgical professions. AMS 5385 it shall henceforth be.*

A Stainless Record

We note STEEL's article, "Nickel Shortage Shifts Focus to Type 430 Stainless," (Aug. 20, p. 66) and take pride in advising that we were one of the first to see its possibilities. Under test, we find it stands as much abuse, if not more, than Type 302. During the last nine months of 1951 we will have built nearly 5100 stainless steel boats and have yet to receive a complaint.

H. Tex Reddick, president
Regal Products Ltd.
Adams, Wis.

Time-Locked Priority Plan

I am taking this opportunity to express our appreciation of the manner in which STEEL handled the news of Mr. Appleton's "Time-Locked Priority Plan"—(Substitute for CMP Proposed, Aug. 13, p. 46).

We are also interested in your editorial, "The Greater Threat," appearing in the same issue. The thoughts expressed certainly are right down the alley of what is needed. Can you send a dozen copies?

Fred Rost
Vice president, industry relations
Appleton Electric Co.
Chicago

"RIGHT ON TIME, READING COPPER TUBING DELIVERIES CERTAINLY ARE DEPENDABLE!"

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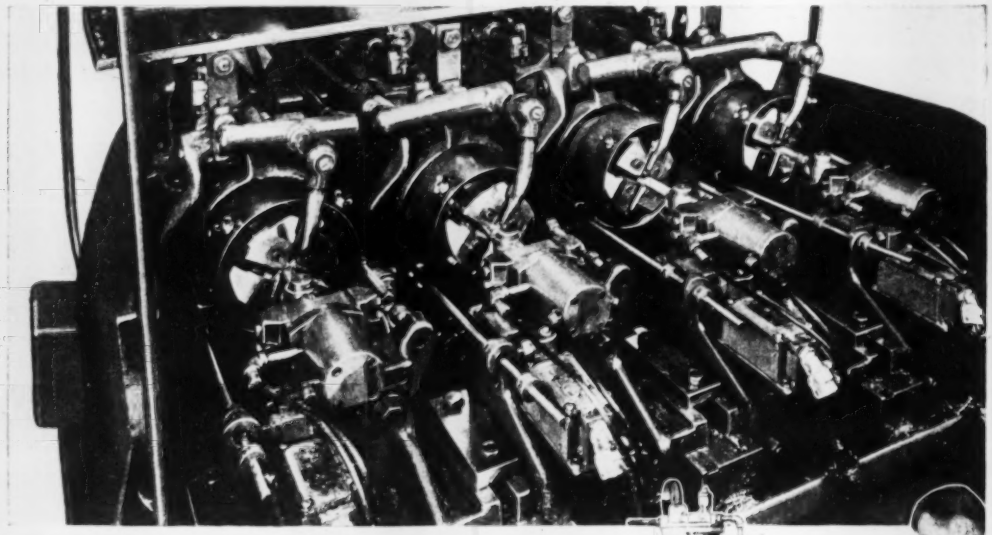
Labor Cost Slashed 50%

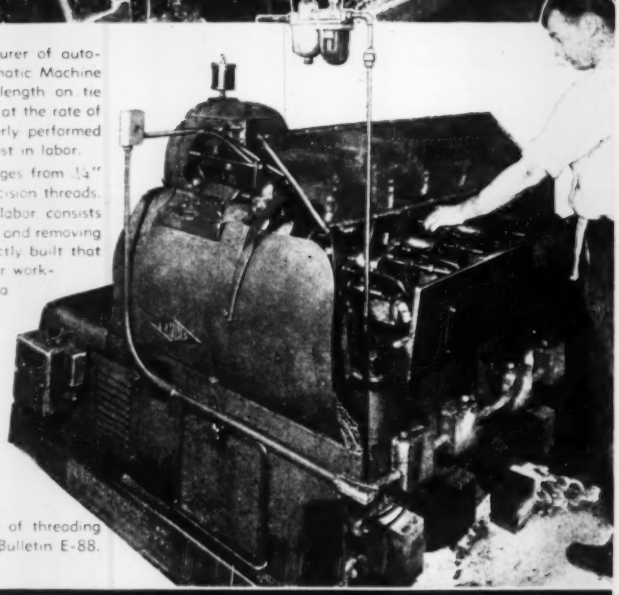
...WITH ***LANDIS*** SEMI-AUTOMATIC MACHINE



Illustrated in the plant of a large manufacturer of automobile parts is a LANDIS 4 Spindle Semi-Automatic Machine mass-producing 7/16" 18-P threads 2¼" in length on tie rod sockets. The threads are cut to a Class 3 fit at the rate of 520 pieces per hour. This operation was formerly performed on a double-spindle machine . . . at twice the cost in labor.

This machine, whose diametrical capacity ranges from ¼" to 1", is designed for the mass-production of precision threads. During the operation illustrated here, manual labor consists merely of placing the blanks on work-holding pins and removing them when threaded. The machine is so compactly built that one operator can easily reach any one of the four work-loading stations from a fixed central position—a feature which enables one man to do the work of two with minimum operating fatigue.

Through the combined output of four die heads, high production is obtained at comparatively low spindle speeds. This feature not only results in finer thread finish, but also greatly extends chaser life, thus effecting a sharp reduction in tool cost. Other advantages inherent in the LANDIS 4 Spindle Semi-Automatic Machine include: quick set-up, thread concentricity, elimination of side-shave, and adaptability to a wide range of threading operations. For complete information, write for Bulletin E-88.



LANDIS *Machine* COMPANY · **WAYNESBORO PENNSYLVANIA**

Farrell-Cheek's CRANE WHEELS

SKIP, INGOT CAR, GANTRY, MONORAIL, CHARGING MACHINE

Farrell-Cheek's crane wheels can be supplied to suit your exact requirements. Controlled heat treat, a completely modern plant, selected alloys, and thorough research by our staff of engineers, produces wheels which give service from four to eight times greater than ordinary wheels.

Wherever wheels receive day-in day-out heavy use . . . such as on overhead or gantry cranes, charging machines, ingot buggies, skip hoists, or on transfer and kiln cars . . . Farrell-Cheek provides the best wheel for the purpose, and best with Farrell-Cheek means minimum wear, long life, and thoroughly satisfied users.

Farrell-Cheek wheels are made to be highly resistant to shock loads and to abrasive wear. They have earned their fine reputation by giving maximum, trouble free service on the job. All wearing surfaces are carefully hardened of the finest of pressure cast steels. Endurance, ***freedom from frequent change over,*** economy and safety are all inherent in any Farrell-Cheek wheel.

Farrell-Cheek's one-point service is truly complete. Either standard or special designs can be furnished. Our engineering department will gladly design according to your needs and specifications. We welcome inquiries. Farrell-Check Steel Company has earned a fine reputation for its ability to provide the best product for your use.

F-"85"

F-"85" is a special purpose cast steel which can be heat treated through selective processing. Treads and flanges or toughened and hardened for maximum resistance to shock and abrasive wear.

HARD EDGE

Farrell's Hard Edge cast steels produce wheels in which treads and flanges are processed and treated through a depth of from 1/8" to 5/16", according to the size of the wheel. This extremely tough, hardened surface is backed with alloy steels having a Brinell rating of from 285 to 315. All Farrell wheels are supplied with either straight, tapered, or radiused treads . . . bushed or finished.

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MANUFACTURERS OF HIGHEST QUALITY ELECTRIC FURNACE CARBON AND ALLOY STEEL CASTINGS

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Wire Rope Fittings, Chaker Hooks, Bar Benders, Cutters.

YOUR INQUIRY WILL PROMPTLY BRING DETAILED INFORMATION PERTAINING TO ANY OF THE ABOVE FARRELL-CHEEK PRODUCTS

SANDUSKY, OHIO U.S.A.

WHY IT PAYS

to reclaim worn forging dies with "HASTELLOY" Alloy C

Trade-Mark

Rebuilt Dies Often Last Longer Than New Ones:

Besides eliminating the total loss of scrapping a worn forging die, rebuilding dies with HASTELLOY alloy C frequently makes them last longer than new ones. Most shops have found that repaired dies last 2 to 3 times longer than the original metal. Also, when a reclaimed die finally does wear, it can be machined and faced again.

HASTELLOY Alloy C Is Easy To Apply:

Alloy C rod can be easily applied to the worn contour and part lines of old forging dies. Preheating is seldom necessary except to speed welding of very large dies. The rod can be applied to any of the common die steels by arc welding.

Deposits Are Machinable:

When deposited, HASTELLOY alloy C has a hardness of about 200 Brinell. It can be machined by any of the common diesinking tools. Grinding is not necessary.

Peening Is Eliminated:

There is no need to peen or hammer a HASTELLOY alloy C deposit. Deposits work-harden in service to from 325 to 375 Brinell and have excellent resistance to chipping and spalling.

If you visit the National Metals Exposition in Detroit, October 15 to 19, drop in to see us in Area F-140. Our engineers will be glad to discuss your hard-facing problems with you. Our display will also include high-temperature and corrosion-resistant alloys, cutting tools, investment castings, and special machinery parts.

HAYNES TRADE-MARK *Alloys*

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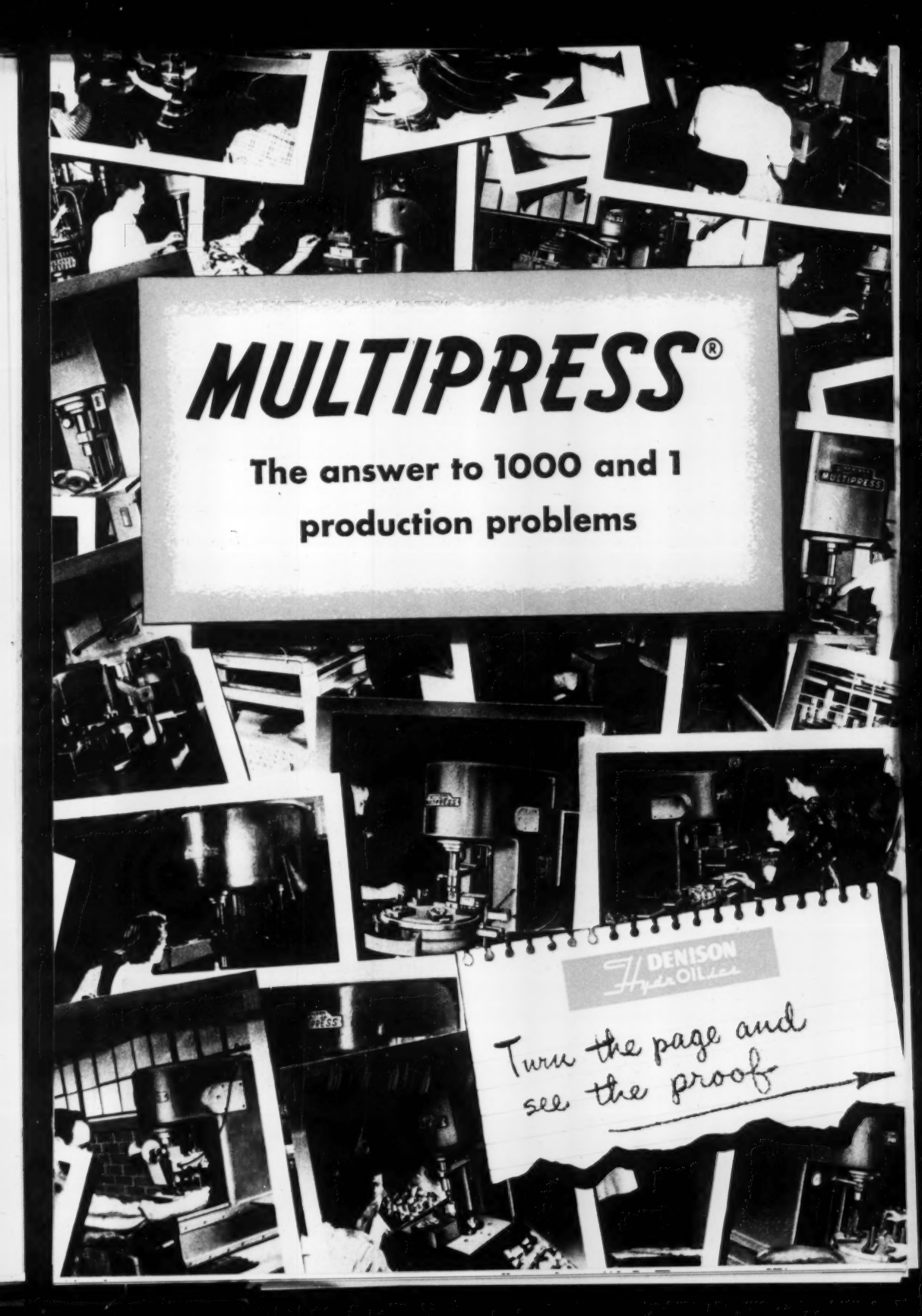
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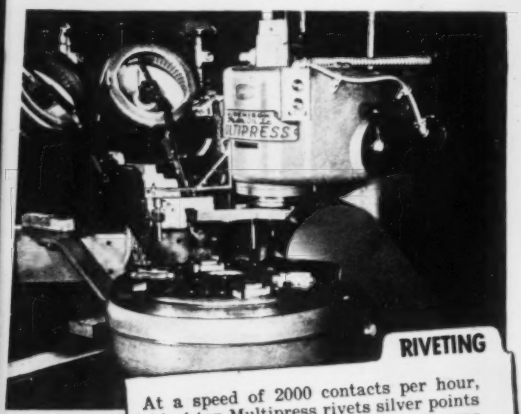


RIVETING

At a speed of 2000 contacts per hour, this 4-ton Multipress rivets silver points on spring steel and brass contact arms at the Chicago plant of one of the country's largest electric appliance manufacturers. The press is equipped with six-station Multipress Index Table powered by the hydraulic system of the

RIVETING

Production was boosted 100% on motor-cycle-wheel subassemblies with this 25-ton Multipress. Other advantages included slashing of rejects to less than half of one per cent . . . the need for straightening finished assemblies dropped from 89 per cent to zero . . . assemblies resulted from use of

ASSEMBLING

34-piece automobile door latches are completely assembled at the rate of 12,000 finished units per day. Thirteen Multipresses in this ingeniously arranged production line assemble auto door latches made up of 34 separate parts, in a series of closely integrated operations handled by 30 women operators. Eleven of the Multipresses are equipped with HydrOILic Index Tables,

ASSEMBLING

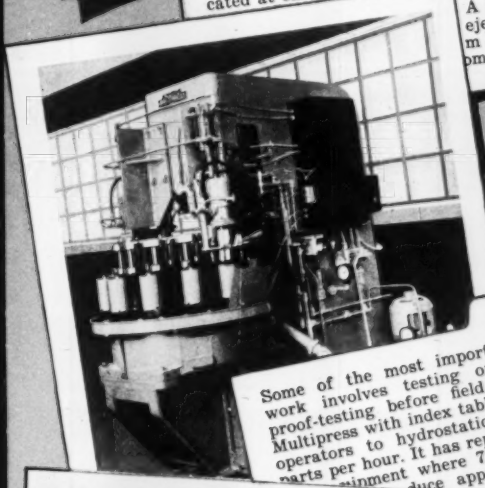
Boosting production from 900 assemblies per hour to more than 1500, this 25-ton Multipress automatically assembles a square-shank bolt to the base of an insulator holder. In addition to this 66⅔% faster production, Multipress does the job more accurately, with fewer rejects, and makes the work easier and safer for the operators. Bolts are set in the holders and placed in fixtures on the six-station HydrOILic Index Table with which

BROACHING

Three times the speed of the previous equipment is attained on this 6-ton Multipress, in broaching splines on small crankshafts that operate automobile windows. Broaching fixtures located at each of the six stations on the o beneath A knock- ejects fin- m tooling omatically

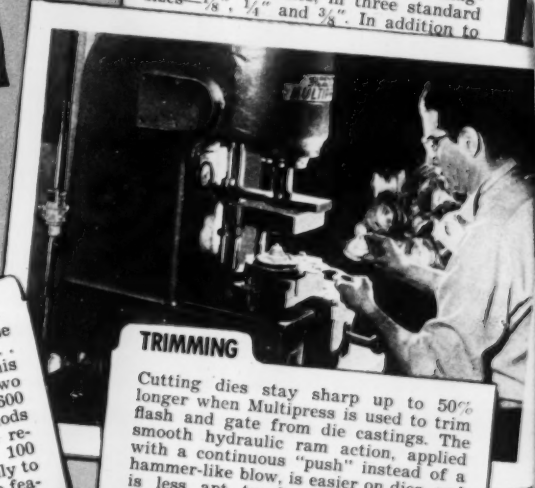
SWAGING

Production rate 800% faster! A swaging operation that used to take more than **three minutes** is now done in **24 seconds** on this 8-ton Multipress. The job is to taper half-inch steel tube into caulking-gun tips or nozzles, in three standard sizes—1/8", 1/4" and 3/8". In addition to



TESTING

Some of the most important defense work involves testing operations . . . proof-testing before field usage. This Multipress with index table enables two operators to hydrostatically test 600 parts per hour. It has replaced methods ...vironment where 7 men were re- ...duce approximately 100 ...required only to ...chine fea- ...roof-



TRIMMING

Cutting dies stay sharp up to 50% longer when Multipress is used to trim flash and gate from die castings. The smooth hydraulic ram action, applied with a continuous "push" instead of a hammer-like blow, is easier on dies, and is less apt to damage ... parts. Uneven ... and a

CRIMPING

Production speed more than doubled—jumping from 500 pieces per hour to 1100—when this 4-ton Multipress was applied to the tricky job of crimping thin metal tubing to ceramic bushings used in the manufacture of ... The 2-position ...

STAKING

A six-part assembly job handled at rate of 4500 per day! Better assemblies, fewer rejects, less breakage and other production gains were quickly realized when this manufacturer of electrical equipment switched to Multipress for intricate assembly ... Multipress ...

NEXT PAGE SHOWS HOW MULTIPRESS DOES IT

ONLY MULTIPRESS

offers all these production boosting advantages

● Pressure adjustment is infinitely variable ● Ram speeds up to 1300 inches per minute ● Sizes from one ton through 50-ton range ● Stroke can be preset to either distance or pressure limits ● Approach and pressing speeds are independently adjustable ● Controls for time delay, hydraulic interlock, and sequence operations ● Exclusive Vibratory Ram Control permits rapid repeat strokes ● Rapid traverse can be combined with controlled pressing speeds ● Manual or automatic ram controls ● Dual controls for maximum safety ● Highly compact design saves floor space ● Ideally suited for operation by unskilled workers ● Controlled working speeds cut rejects, reduce die wear ● Quieter, smoother operation reduces worker fatigue ● Tailored to individual production needs for highest efficiency.

In addition to new levels of operating speed, efficiency, precision, and ease of adjustability to changing needs, Multipress offers basic advantages that bring improvements on almost every type of application. Its oil-smooth hydraulic action means that pressures are always applied in a steady, even flow of controlled power—and not with sudden, hammer-like blows—no matter how rapidly pressure is applied. This results in less chance for damage or distortion of parts, less strain on materials, less wear and tear on dies, and quieter action that is less fatiguing.

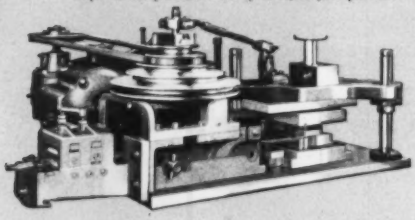
Multipress is tailored to individual production needs, in eight different frame sizes. Write today for complete information, or for recommendations based on your specific requirements.

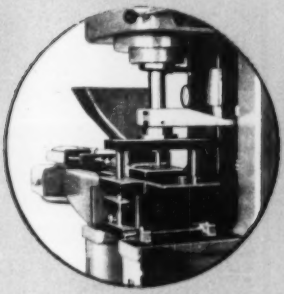
The DENISON Engineering Co. 1163 Dublin Road Columbus 16, Ohio

DENISON HydrOILics

Six and 12-station Multipress Indexing Tables, driven by the hydraulic system of the press, are available on all automatic Multipress models, to feed parts automatically to the press ram.

Multipress offers the exclusive Harmonic Stock Feed, for high speed blanking, forming or punching, from continuous metal strip. Permits production rates up to 50,000 parts per hour.





Multipress Shuttle Feed Accessories provide automatic feeding, pressing, and ejection of loose granular or powdered materials.

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"Forgings by Finkl" . . . a byword in the industry . . . the best obtainable. "Forgings by Finkl" means that skilled craftsmen, employing modern methods and machinery, have selected the best steel for the job and created the best job from the steel. And to doubly insure long life and economical performance, each step in the development of the forging is thoroughly checked metallurgically. Nothing is taken for granted.

A medium size forging, illustrated above, is the top head for a 2,000 ton hydraulic press. It is made of C-1045 steel, normalized and drawn in one of Finkl's heat treating shops. Forged from a 59″ ingot, the rough machined forging shown weighs 22,800 pounds. Whether carbon or alloy steel, the Finkl organization can easily handle any job from a few pounds up to 50,000 pounds apiece.

Write or phone when you are ready to talk about or plan your forgings. The experience of Finkl Sales Engineers is available to you.

MANUFACTURERS OF THE LARGEST FORGINGS IN THE MIDDLE WEST

A. Finkl & Sons Co.

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You get more from Scovill brass because it's continuous-cast!

Waste is minimized when you use Scovill Brass Mill Products.

That's because of Scovill's leadership in the development and commercial production of *continuous-castings* in America. Since 1938, about one billion pounds of brass billets and bars have been continuous-cast by Scovill.

From continuous-cast billets or bars are derived Scovill Brass Mill Specialties of outstanding importance to the metalworking industry. These include:

Strip and Sheet Brass (Copper-Zinc Series)
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Extruded Cold-Heading Wire (Cartridge Brass, 70%)
Phosphorized Admiralty Condenser Tube
Standard Forging Brass (Alloy No. 284)

All of these outstanding Scovill Brass Mill Products have as their unique continuous-casting advantages:

1. **Uniformity of Chemical Composition:**
Minimum variation of all alloying elements from lot to lot . . . minimum presence of impurities . . . elimination of any type of element, compound or phase segregation.

2. **Inherent Soundness:**
Uniformity of basic cast structure . . . freedom from damaging subsurface blisters, spills or dirt . . . absence of weaknesses caused by intercrystalline shrinkage . . . elimination of porosity.

"You Can't Buy Better Brass" than Scovill brass, though under present conditions you may have to accept restricted allotments. Scovill prepared for increased demand after World War II by building the world's most modern Continuous Strip Mill and modernizing other existing mills. But today's raw material shortages (copper, zinc, etc.,) are beyond Scovill's control, while demand continues at an all-time high.

When you do get Scovill *continuous-cast* Brass Mill Products, you'll see how they go further.

"You can't buy better brass"

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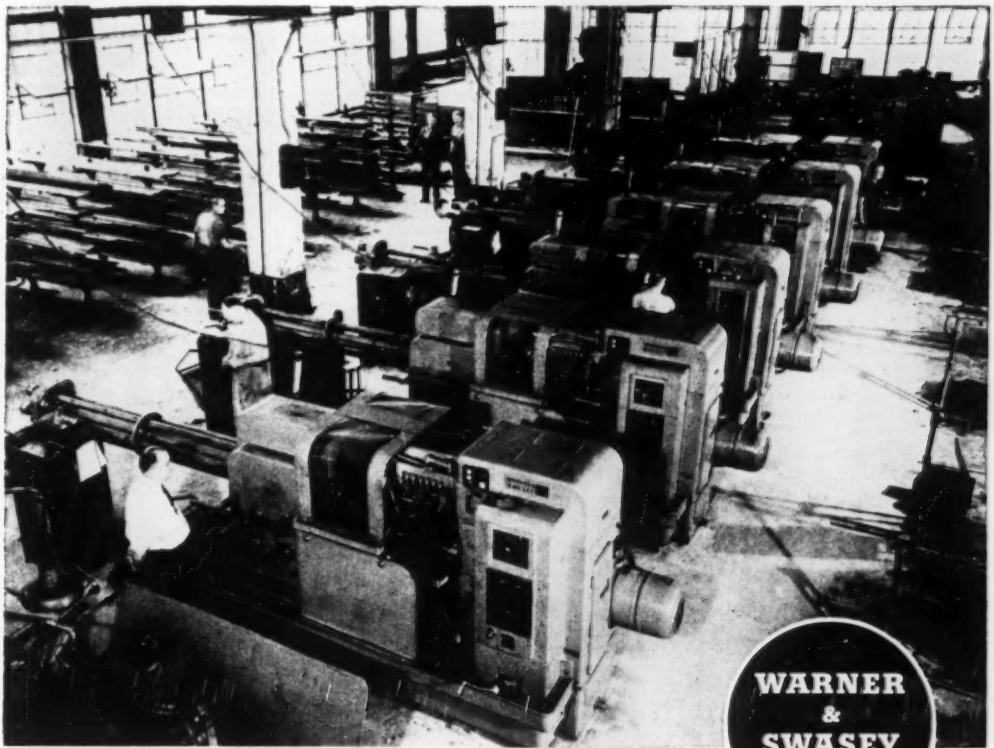
One manpower problem solved

BY WARNER & SWASEY AUTOMATICS

● At Otis Elevator Company, 6 Warner & Swasey 5-spindle Automatics replaced 17 older machines—and 6 critically needed men were released to work elsewhere in the plant.

These automatics are used at Otis for short runs on specially machined parts—studs, bolts, nuts and other screw machine products—required for custom-made elevators. And only 3 men are required to set up and operate these 6 automatics—an important point to consider in today's tight manpower market. Parts are now more uniform, and are produced at a higher rate.

If manpower is one of *your* problems—or if you need new machines to keep pace with present day production demands—have your Warner & Swasey Field Engineer show you just how automatics can fit into your production setup.

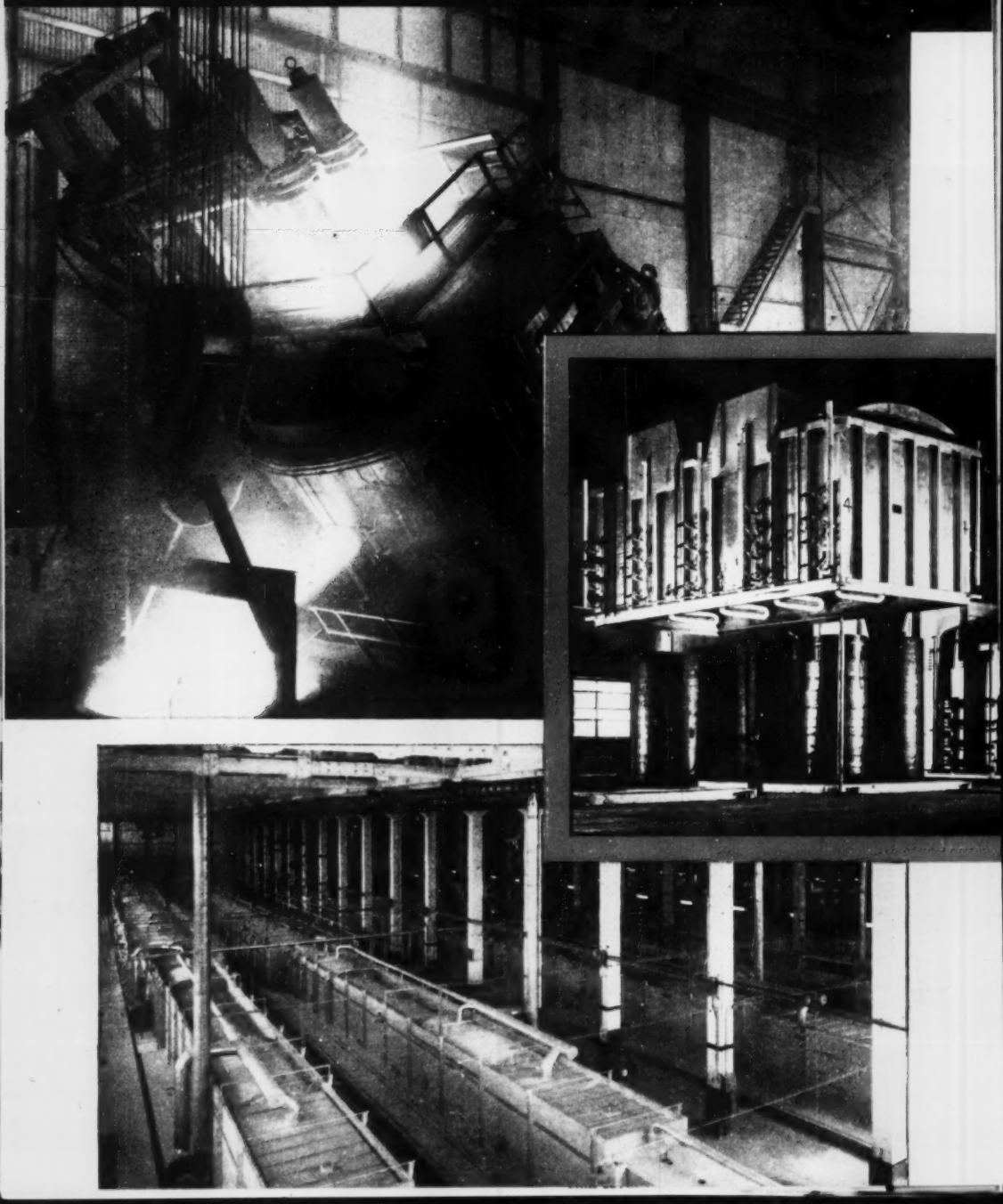


The Warner & Swasey 5-Spindle Automatic line at the Yonkers Works of the Otis Elevator Company.

WARNER & SWASEY
Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS, AND TAPPING MACHINES

SWINDELL-DRESSLER



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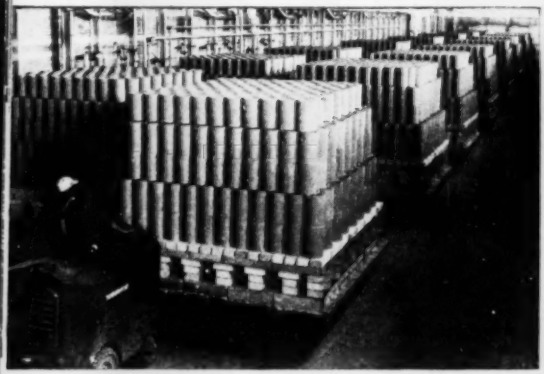
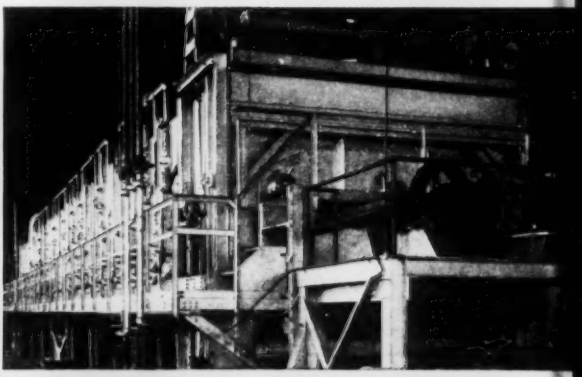
Effectively Aiding
GREATER PRODUCTION of
Metals and Ceramics Essential
to the National Defense Program





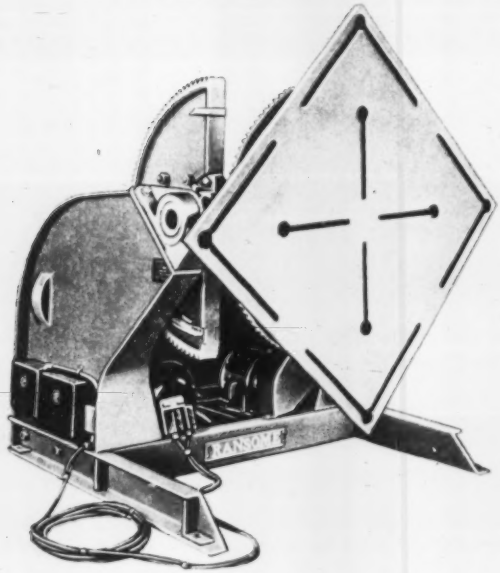
SWINDELL-DRESSLER *Corporation*

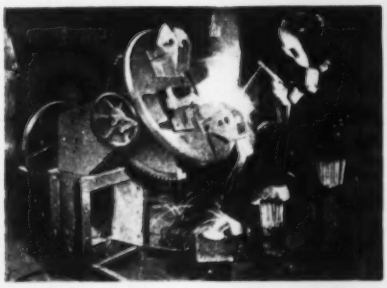
DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES

PITTSBURGH 30, PA.

Lots of Different Pieces or Lots Alike...

THIS POSITIONER PAYS OFF





in more production . . . better welds . . . less rod waste

The universal table top makes the Worthington-Ransome Welding Positioner as profitable on *job* work as it is in mass production. Those "T" slots make the table adaptable to any shape of work piece and a wide range of sizes. No special jigs or fixtures needed.

Whether you produce "thousands alike" or "every one different", benefit from *increased arc-time* with Worthington-Ransome Welding Positioners. With just one set-up, the work is clamped to the table top. Then push-button controls or simple hand cranks do the work of tilting or rotating into any position convenient for economical downhand welding. Your welder can continuously weld without costly time and labor wasted in frequent rehandling of the work.

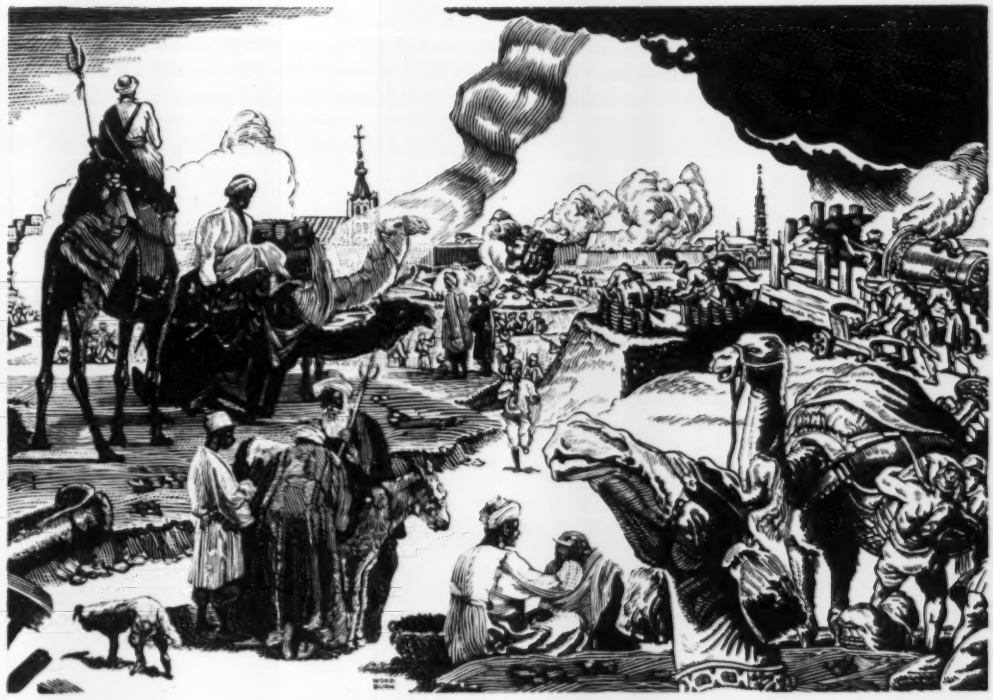
Result—up to 50% more footage, *better* welds (using higher current and heavier rods), less welding rod waste.

Welding positioner capacities from 100 lb to 30 tons. Also: turning rolls from 3 to 150 tons, stationary or self-propelled.

Write Worthington Pump and Machinery Corporation, Dunellen, New Jersey, for bulletins or additional information.

WORTHINGTON

V.1.2



Steel saved civilization at Vienna

MODERN history begins with the record of conflict between Christians and Moslems--six centuries of wars that opened with the Crusades and saw the Turks capture Constantinople in 1453.

More than 100,000 Turkish janizaries and cavalry besieged Vienna in 1683. For two months, to quote the diary of an eye witness, "The enemy continued playing their cannon and granadoes. But the city walls were strong, Christian cannon were bigger and more numerous and ammunition more plentiful." Finally came a day when the officer's journal reported, "The enemy did not play their cannon so fast. It was confirmed that they had no great provision of bullets, inasmuch as they shot back not only our bullets, but also pummels of swords and all sorts of iron and stones."

At last a great Christian relief army was assembled. "They made an attack in the best order that ever army did. The enemy, forced always to give back, were put all into confusion. They betook themselves to flight, leaving all their provisions, ammunition, cannons and tents --the greatest part rendered unfit for farther use by our great guns."

Never again did the Turks seriously menace Christendom. Western civilization had been saved once more by its supremacy in the use of iron and steel. To aid our survival America's free private industry is producing steel at the highest rate ever known--and still expanding. The question remains--Will America use enough of this tremendous steel production to guarantee the continued supremacy of Western, Christian civilization?---We believe the answer is yes!

YOUR SCRAP IS NEEDED — YOUNGSTOWN

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York
MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

. . . IT'S THE Cost per Cut THAT Counts

Study these high production, low cost figures on three Motch & Merryweather Circular Sawing Machines

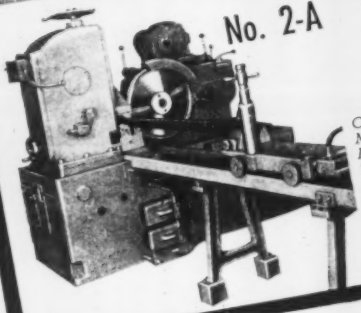
Make your own study of the cost per cut in your metal-sawing department. Then find out from Motch & Merryweather how much production at lower cost you can get on M. & M. Circular Sawing Machines, using our Triple-Chip blades.

Operation: Steel door frames (mitre cut).
Material: Rolled steel shapes 6" wide x 1/16" thick.
Production: 200 pieces per hour.
Tool cost per piece: $.0002.

No. 00-G

M. & M. No. 00-G Circular Sawing Machine. Manual or automatic stock feed. Readily adaptable to making cuts at angles up to 45° as well as high production square cut-off. Capacity: up to 3" diameter round; shapes—up to 3-3/8" x 6".

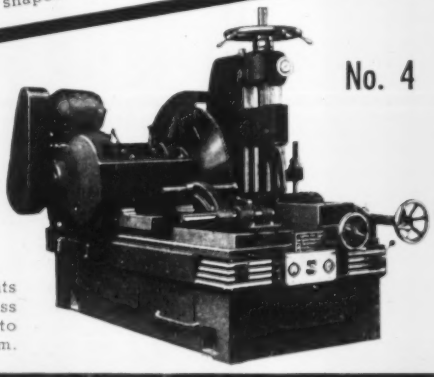
No. 2-A

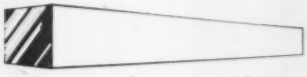


Operation: Rocket nozzle stock cut to length.
Material: S. A. E. 1020, 5" diameter.
Production: 60 pieces per hour.
Tool cost per piece: $.001.

The No. 2-A machine pictured at the left has automatic stock feed up to 72" cut-off lengths. It is offered also with manual stock feed. Capacity: up to 6-1/2" diameter round; structural shapes—up to 5" x 12".

No. 4





Operation: Forging billets cut to length.
Material: S. A. E. 1045, 14" square.
Production: 6 pieces per hour.
Tool cost per piece: $.12.

No. 4. Widely used in steel and structural steel plants and forge plants sawing all types of forging, stainless and titanium alloys, die block steel, etc. Capacity: to 17" dia. round; structural shapes up to 24" I-beam.

Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
715 PENTON BUILDING • CLEVELAND 13, OHIO
Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT

Ingersoll

SPECIALISTS
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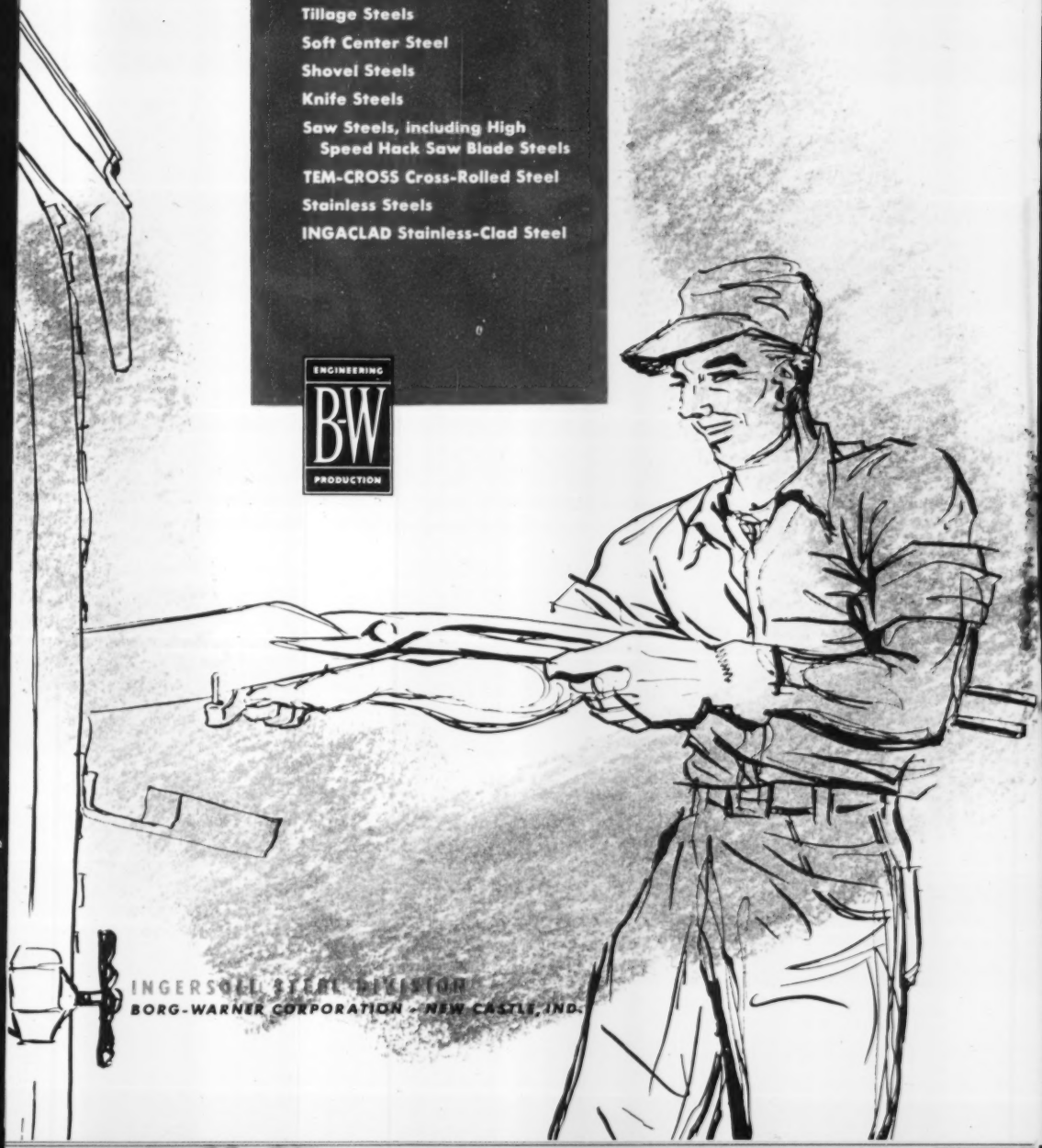
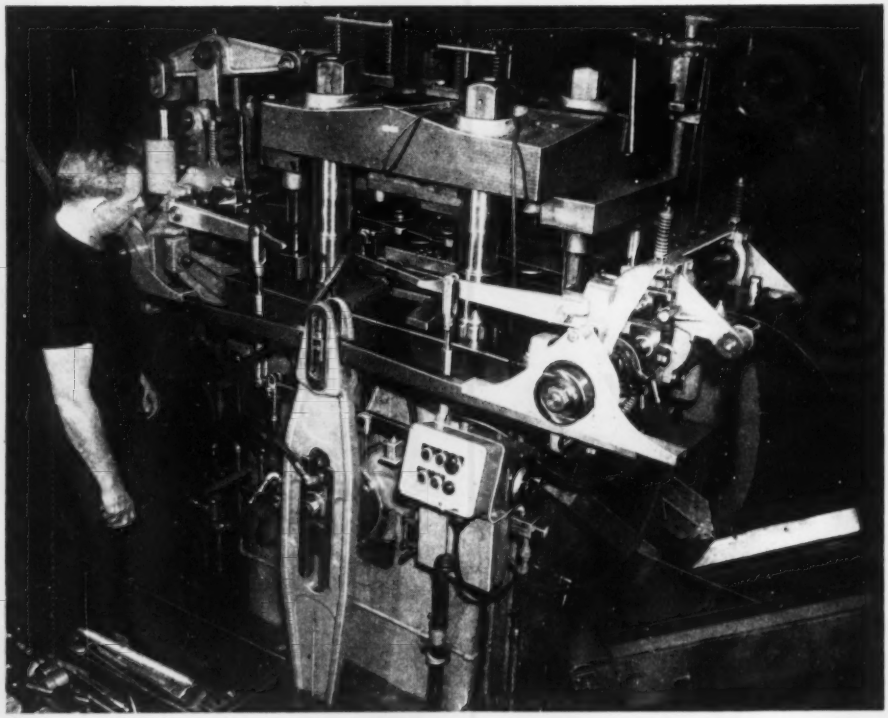
- Alloy Steels
- Armor Plate
- Clutch Plate Steels
- Tillage Steels
- Soft Center Steel
- Shovel Steels
- Knife Steels
- Saw Steels, including High Speed Hack Saw Blade Steels
- TEM-CROSS Cross-Rolled Steel
- Stainless Steels
- INGACLAD Stainless-Clad Steel

ENGINEERING
B-W
PRODUCTION



INGERSOLL STEEL DIVISION
BORG-WARNER CORPORATION - NEW CASTLE, IND.



For The Oldberg Manufacturing Company*

which uses Henry & Wright Dieing Machines to produce muffler parts such as oval outerheads, oval innerheads, three-pass innerheads and cones. Oldberg, like other leading companies who know the score, rely on Henry & Wright Dieing Machines to slam a cover on rising production costs. These compact, precise, metal-fabricating wonder workers swing at costs with a two-fisted attack. And what a licking these costs take. They just can't stand up to the one-two combination of high speed and long die life delivered by Henry & Wright machines.

*Subsidiary of The AP Parts Corporation, Toledo, Ohio, manufacturers of: Mufflers, Pipes, Miracle Power, DGF 125.

Only the best is

OTHER EMHART PRODUCTS INCLUDE:

GLASS MAKING MACHINES

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AUTOMATIC PACKAGING EQUIPMENT

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PLASTIC BOTTLES, RODS, TUBES, SPECIAL SHAPES

PLAX CORPORATION
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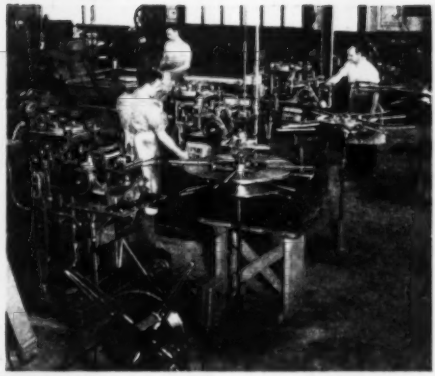
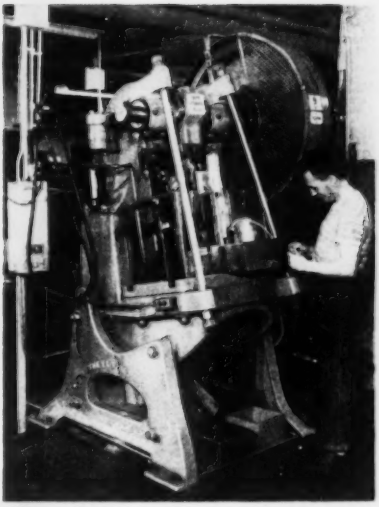


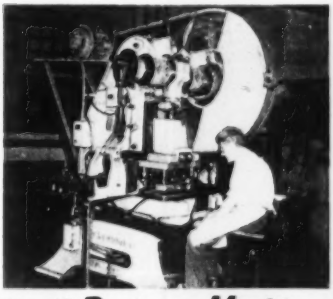
For Barber-Colman Company

where Henry & Wright Dieing Machines are "an important contributor to the production of many of our products, particularly our Uni-flo Air Distribution Outlets." Above 25-ton units are piercing, folding and cutting off strips of grill material to predetermined lengths.



For Gillette

where 10-, 25-, and 50-ton V & O presses are used. Above 50-ton machine forms the cap for the Gillette one-piece razor at production rates of approximately 4,000 parts per hour. Engineered for close tolerance work, V & O presses are preferred by companies making precision-built products.



For International Business Machines

which uses V & O presses for numerous precision parts. The above V & O press is producing an armature for relay assembly out of coiled, cold-rolled electrical iron. Five working stations are used. The part is trimmed, pierced with two holes, finish blanked, and offset at one end. In the final working position, two ears are bent up and a second offset is formed.

HENRY & WRIGHT
DIVISION OF EMHART MFG. CO.

THE V & O PRESS CO.
DIVISION OF EMHART MFG. CO.

good enough

FACT PACKED CATALOGS

Catalogs containing complete specifications and operating details are available. Please write The V & O Press Company, Hudson, N. Y.

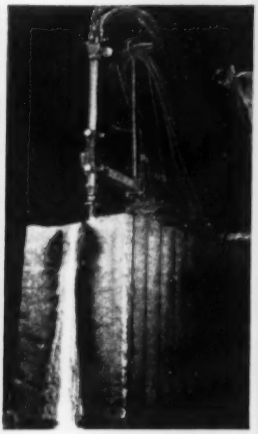
Complete descriptions of all Henry & Wright Dieing Machines. Write: Henry & Wright, 443 Windsor St., Hartford, Conn.

These Metalworking Methods Save Time and Money

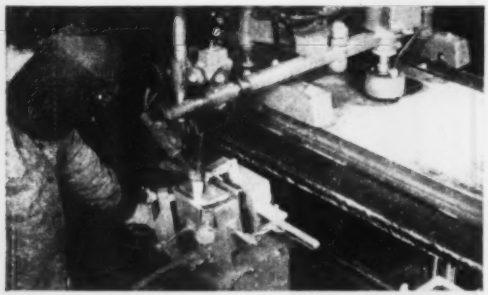
These six methods for keeping production geared to current demands are typical of the many processes and products available through LINDE. Not shown, but equally available to LINDE customers, is the invaluable combination of knowledge, technical skills, and wide practical experience that makes such developments possible.

Whatever you do with metals, there is a good chance that LINDE know-how, show-how, and equipment can help you do it better, quicker, or cheaper. Telephone or write our nearest office today.

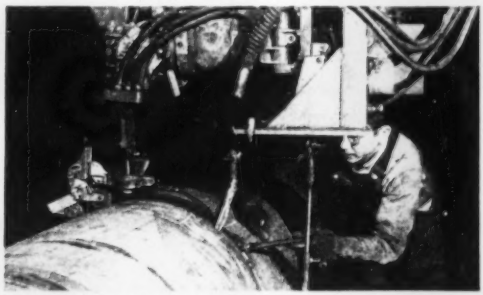
LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: Dominion Oxygen Company, Limited, Toronto



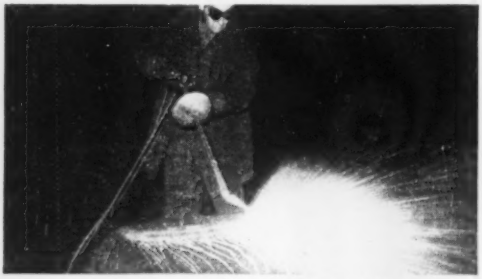
(Left) Flame-hardening gives added service life to parts by providing a hard, wear-resisting surface on a tough, ductile core. (Right) Oxygen-cutting equipment easily slices steel up to 60 in. thick. A 30-in. cut through this 45-in. thick ingot took only 15 minutes.



HELIARC welding in a protective shield of argon or helium gas easily joins hard-to-weld metals such as aluminum, magnesium, stainless steel, and copper alloys. Absence of flux and spatter reduces cleanup and finishing costs.



UNIONMELT welding, a mechanized electric process, joins metals of any thickness without sparks, spatter, smoke, or flash. Welding speeds as much as twenty times greater than by other similarly applicable methods are common.



Powder-scarfing halves conditioning costs on stainless steel. One 8-hr. shift, using two blowpipes, easily powder-scarfs 22 to 24 ingots of 1,000 lb. each.

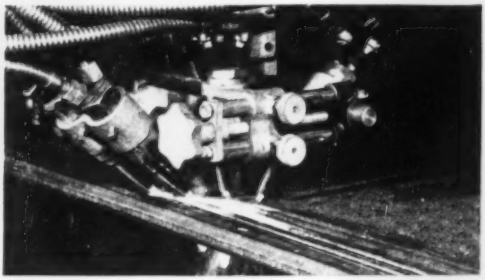


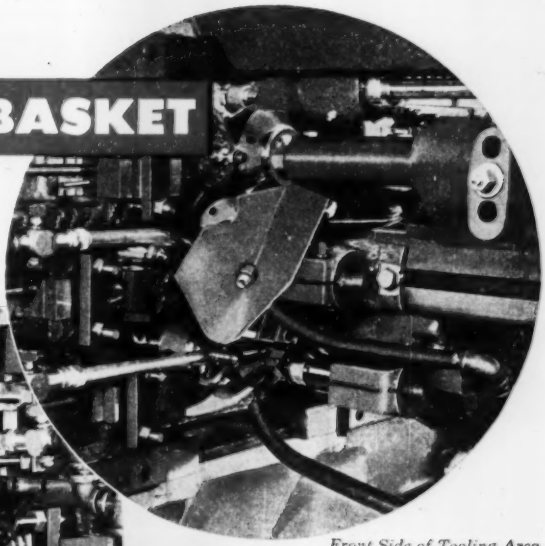
Plate-edge preparation with OXWELD apparatus makes it possible to cut steel plate to size and bevel the edges for welding in one, quick, oxygen-cutting operation.

Linde
Trade-Mark

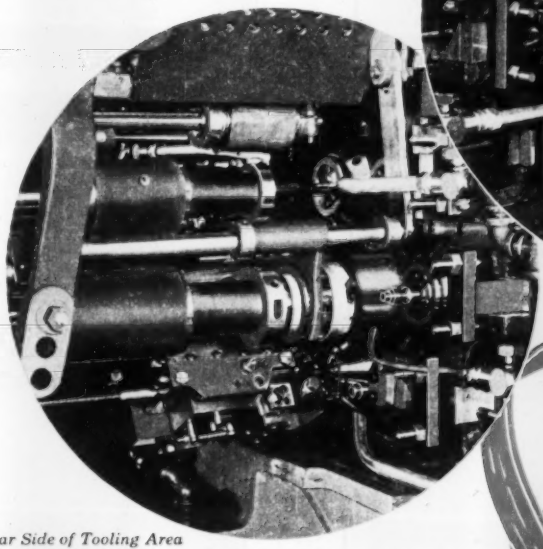
Products and Processes for MAKING, CUTTING, JOINING, TREATING, AND FORMING METALS

The terms "Heliarc," "Linde," "Oxweld," and "Unionmelt" are registered trade-marks of Union Carbide and Carbon Corporation.

MORE IN ONE BASKET



Front Side of Tooling Area



Rear Side of Tooling Area

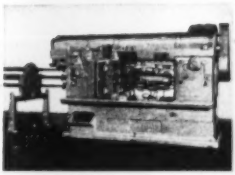
The "automatic" has substantiated many of the advantages of centralized responsibility in metal turning.

Even the earlier users realized that more work pieces can be profitably placed in one basket *if nothing upsets the basket.* Dependable performance has always been vital to the successful use of the "automatic".

The factors that determine the degree of dependability of an "automatic" are a very important part of its specifications. They are a part of the *complete* information available on CONOMATICS.

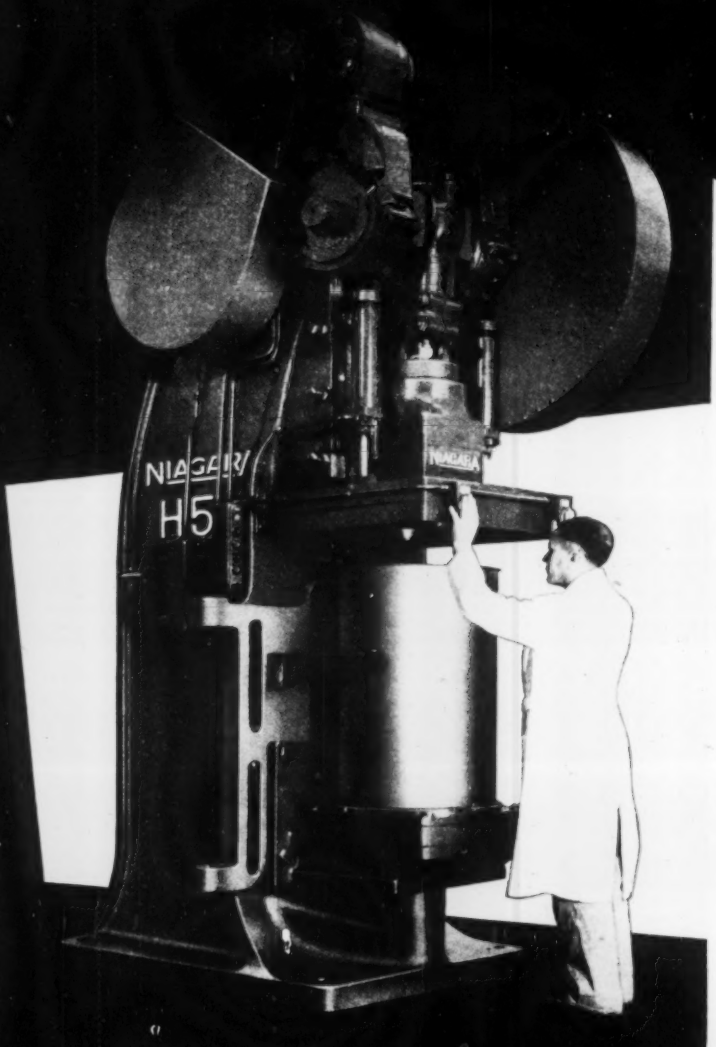
In producing the above part on a 1⅝"-SIX, the cycle time of 14 seconds per piece is not as important as the total time necessary for the entire run. Dependable performance pays.

A Comparison of ALL Automatics is in Favor of Cone



Conomatic } CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.

NIAGARA



Niagara H-5 Geared Horn Press with air sleeve clutch and air releasing brake. Arranged with special table and dies for curling and flanging the ends of a 55 gallon 18-gage steel drum body.

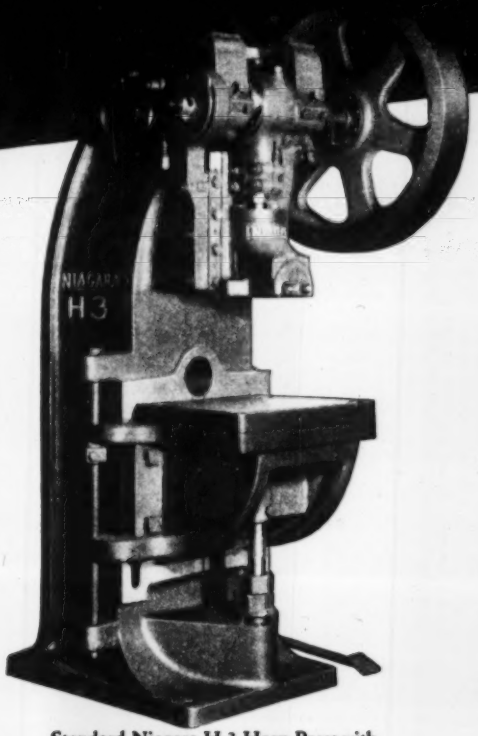
In addition to ordinary blanking and forming work, these presses can be used for a variety of other operations requiring exceptional die height, such as curling, wiring and flanging container bodies. When fitted with a horn they can perform seaming, piercing, riveting and forming operations on the sides of formed shells.

Write **for specifications on sizes to fit your requirements.**

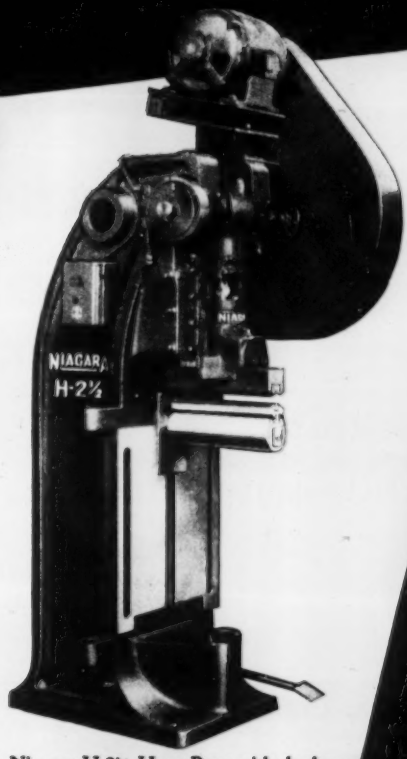
NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

ADJUSTABLE BED HORN PRESSES

offer Versatility for Defense Production



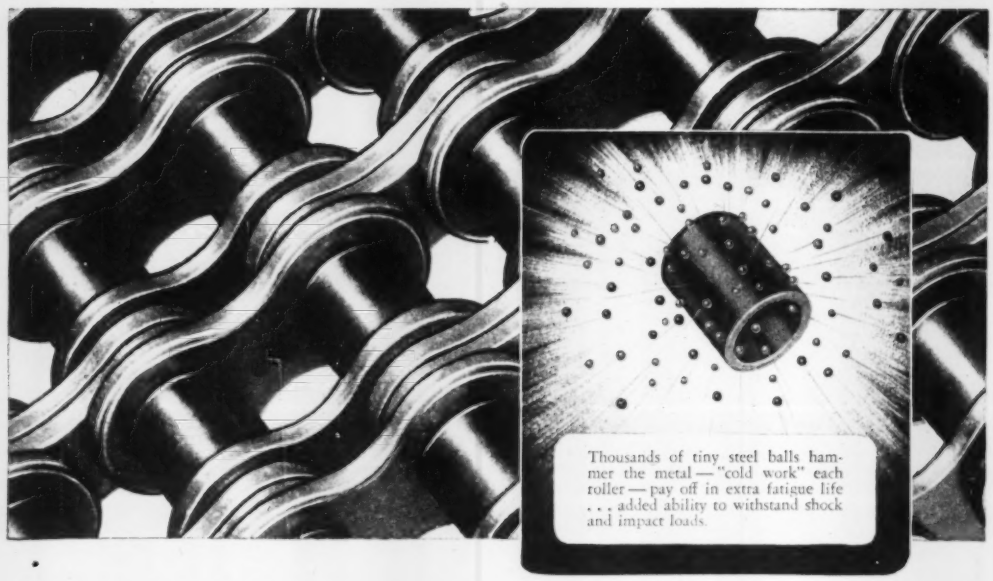
Standard Niagara H-3 Horn Press with swinging, screw-adjustable table.



Niagara H-2½ Horn Press with duplex side seaming horn.

America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK


Thousands of tiny steel balls hammer the metal — "cold work" each roller — pay off in extra fatigue life . . . added ability to withstand shock and impact loads.

Why you should be sure the roller chain you buy has

SHOT-PEENED ROLLERS

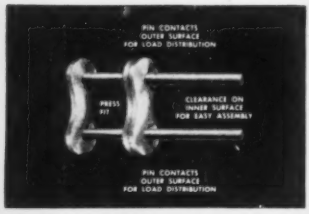
. . . one of the extra-strength features you get with every LINK-BELT Roller Chain

LOOK for the distinguishing darkened rollers on every roller chain you buy! They're your guarantee of extra fatigue life.

Shot-peening is just one of the added manufacturing refinements that make Link-Belt Precision Steel Roller Chain a longer-life chain. Controlled material selection and heat treating assure absolute uniformity . . . no weak members.

Link-Belt Roller Chain is available in single or multiple widths, in ⅜ to 3 in. single and double pitch. For the best in roller chain, get in touch with your nearest Link-Belt office.

Easier coupling and uncoupling without sacrificing load distribution

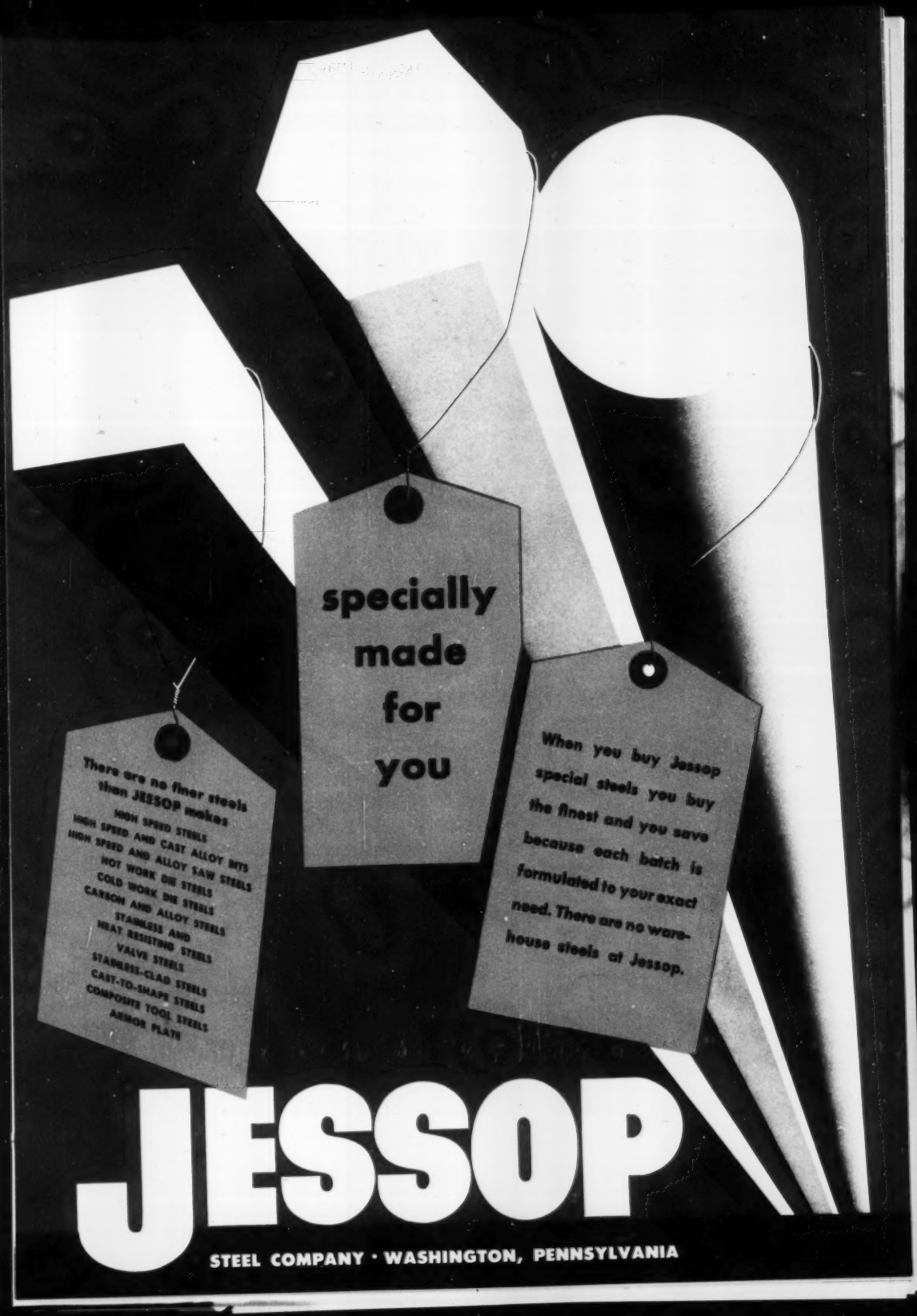

PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION
PRESS FIT
CLEARANCE ON INNER SURFACE FOR EASY ASSEMBLY
PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION

Patented E-Z Assembly feature of Link-Belt Precision Steel Roller Chain has won world-wide approval. Coupling and uncoupling of multiple width chains—right on the job—is far easier. There's absolutely no sacrifice of load distribution . . . no loss of the chain's remarkable performance. Press-fits between chain pins and middle bars have been modified. But full load-carrying capacity across the entire width of the chain has been maintained.

LINK-BELT

PRECISION STEEL ROLLER CHAIN

LINK-BELT COMPANY: Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities. 12.333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made
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There are no finer steels
than JESSOP makes
HIGH SPEED STEELS
HIGH SPEED AND CAST ALLOY BITS
HIGH SPEED AND ALLOY SAW STEELS
HOT WORK DIE STEELS
COLD WORK DIE STEELS
CARBON AND ALLOY STEELS
STAINLESS AND
HEAT RESISTING STEELS
VALVE STEELS
STAINLESS-CLAD STEELS
CAST-TO-SHAPE STEELS
COMPOSITE TOOL STEELS
ARMOR PLATE
When you buy Jessop
special steels you buy
the finest and you save
because each batch is
formulated to your exact
need. There are no ware-
house steels at Jessop.
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STEEL COMPANY · WASHINGTON, PENNSYLVANIA

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IS EVERYBODY'S BUSINESS

Nation-wide . . . world-wide . . . is the impact of the 1951 Metal Show . . . for never before have so many humans looked to the metal industry for the skill . . . the ingenuity . . . the resourcefulness that must be marshaled behind the free world's urgent need for the weapons of defense against a common enemy. That's why this finest and most important Metal Show looms as the vital and timely thing it is . . . a great industry's stirring answer to a world-wide challenge. Be there . . . all the men who make the metal industry what it is will be there, too.

DETROIT
MICH.
Oct. 15-19

NATIONAL METAL EXPOSITION

NATIONAL METAL CONGRESS

WORLD METALLURGICAL CONGRESS

WE'VE PAID YOUR "EXPERIMENTAL" BILL

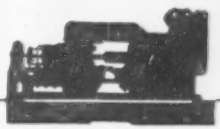
Yes, that's right—you can bid on munitions jobs like this without figuring in any costs for educational orders, trial setups, experimental tooling.

National Acme engineers have done all that for you, months ago. They've worked out standard tooling setups, machining times, tolerances and production methods for countless munitions parts. And these standards have been proved in use on batteries of Acme-Gridley Automatics, all over the country.

This ready-made experience is available for the asking. And in addition, our engineering experts will gladly give you the very latest information on how to get increased production and top performance from your present Acme-Gridley Multiple Spindle Automatics. May we help you turn your production line into a *profit* line, *now*?

JOB FACTS

PART: Nozzle plate ring (Ordnance Division)
MATERIAL: SAE 1020 tubing blanks
SIZE: 5" diameter x 3"
MACHINE: 8" RPA—6 Spindle Acme-Gridley Chucker
1ST SET-UP: 14 operations—46 seconds
2ND SET-UP: 10 operations—1 minute, 7 seconds
COMMENT: Less than 2 minutes machine time for 24 cuts. Tubing stringy and tough to cut; thin wall, difficult to hold concentricity. Wall thickness and thread must be uniform to close tolerances, to pass Government tests.



ACME-GRIDLEY BAR and CHUCKING AUTOMATICS built in 1, 4, 6 and 8 spindle styles, maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

THE NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

WHATEVER YOUR Heat Treating PROBLEM IS...

National Forge has *complete* facilities for heat treating forgings. Pictured here is a battery of vertical treating furnaces and quenching tanks with capacities up to 55 feet in length. In these furnaces forgings are treated uniformly over their entire length and the possibility of strains is minimized. Close metallurgical control by recording pyrometers insures correct heating cycles.

In the field of high alloy steels treated to the ultimate in physical properties, our reputation is nation-wide.

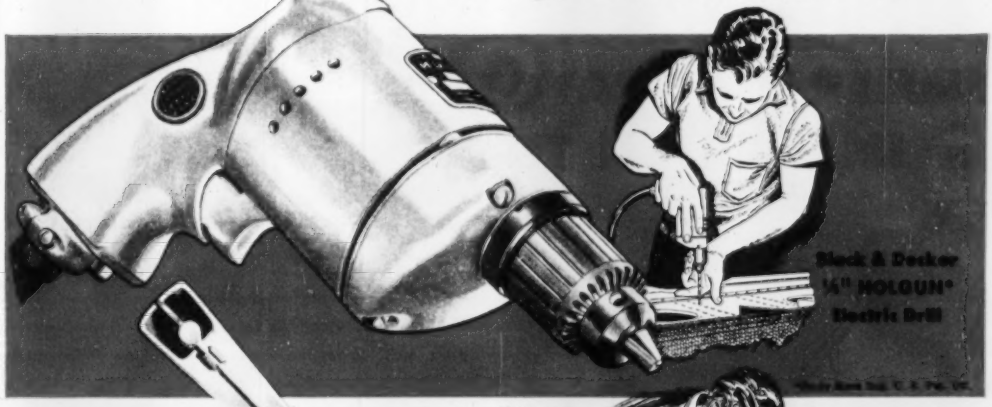
If you want wholly treated forgings, giving you the very maximum obtainable mechanical properties, submit your complete problem to us for our consideration.

NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNSYLVANIA

Drilling Problem?

Black & Decker's Drill Line is a good bet to solve it!



Completeness of Line, Quality Construction Pay Off for Users!

FOR drills to fit your needs for top performance on any portable drilling job—it pays to check Black & Decker *first!* That's because Black & Decker gives you an unmatched choice of Drill models. Capacities from ¼" to 1¼"—choice of handle arrangement for easiest operation—choice of speed, power and price in most capacities. And it's also because Black & Decker Drills give you powerful B&D-built motors—full ball-bearing construction—extra-tough gears, shafts and chuck spindles—husky housings, streamlined design, perfect balance.

Whether your problem is in production, maintenance or construction—whether it requires large or small drills—see your nearby B&D Distributor *first* for expert help. And write today for free, detailed catalog to: THE BLACK & DECKER MFG. CO., 620 Pennsylvania Ave., Towson 4, Maryland.

LEADING DISTRIBUTORS EVERYWHERE SELL

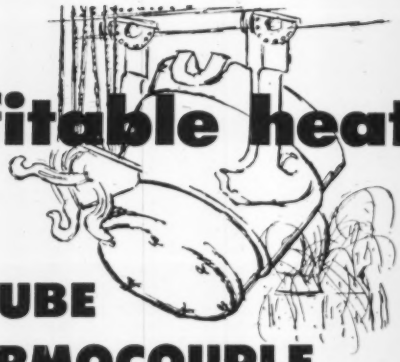
B&D Black & Decker PORTABLE ELECTRIC TOOLS

WORLD'S LARGEST, MOST COMPLETE LINE

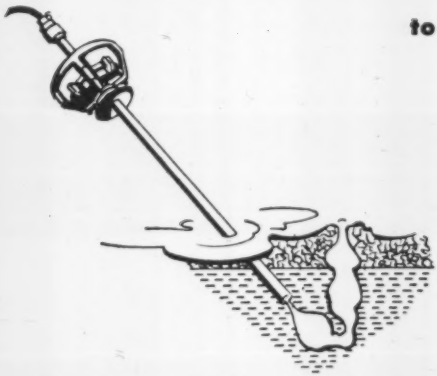
For more profitable heats

choose

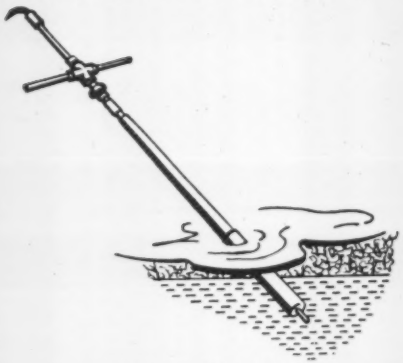
IMMERSION RAYOTUBE or IMMERSION THERMOCOUPLE



to measure temperatures in the steel bath



THE IMMERSION RAYOTUBE is plunged beneath the surface of the bath . . . sights on an air pocket blown in the steel . . . reports temperature to a Speedomax Recorder.



THE IMMERSION THERMOCOUPLE is immersed until couple reaches bath temperature . . . a process guided by signal lights and charted on a Speedomax Recorder.

Open hearth and electric furnace shops can now choose between *two* tested L&N methods for measuring steel temperatures during the melt. Either the Immersion Rayotube or Immersion Thermocouple is plunged momentarily beneath the surface to measure the interior temperature of the bath, while a dependable Speedomax Recorder displays the information where all concerned can use it.

Either method helps improve ingot production by warning if the steel is too hot or too cold for normal pouring. Authorities* have found that some ingots from as many as 44% of overheated melts will stick to the molds, resulting in loss of production time, while as many as 52% of underheated melts will lose yield through formation of skulls in the ladle. *Both of these losses have been sharply cut in every plant where temperature is properly measured while the melt is finished off for tapping.*

Investigate the choice of immersion methods L&N offers to meet plant requirements. *In general,* Rayotubes are employed in heavy-duty shops where several readings may be taken every hour, while thermocouples—although sometimes preferred for such service—find wider application to small or special furnaces. However, a number of factors determine the final choice. Let our experienced engineers analyze your measurement problems and help your staff select the proper equipment.

Contact our nearest office, or write us at 4957 Stenton Avenue, Philadelphia 44, Pa.

* Clark and Feigenbaum of J&L, in AIMME Technical Paper 2031.

LEEDS NORTHRUP

Jrl Ad N-33-640(2)

DESTACO

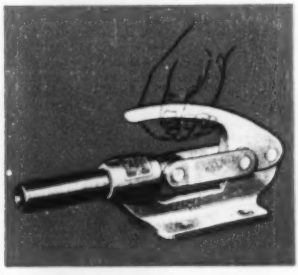
"MULTI-SLIDE"

precision stampings . . .

IN PRODUCTION QUANTITIES . . . RIGHT NOW!

Avoid paying for extra operations by using our "*Multi-Slides.*" Your savings represent production economies measurable in three ways . . . you save tying up *machine time* for second operations, you save on *handling time,* and you save on *inspection time.* This accumulated saving often exceeds 50% on price of parts. ● Our "*Multi-Slide*" machines take coil stock up to 2½-inches wide and 12-inch blank length. They are positive cost reducers on high volume parts production. They perform all operations such as piercing, blanking, forming, swaging, embossing, twisting, curling and re-forming *from coiled stock* as fast as you want production scheduled. This is an especially advantageous method where forming around a mandrel is required. ● For clips, contacts, bearings, terminals, connectors, rotors and tubular shaped parts, this is the *fastest means* known to industry for producing *accurate stampings* to exacting specifications *in quantity.* ● Send specifications and blueprints for a quotation on any part that you think might be made by this method. A "DE-STA-CO" representative near you will see that you get prompt attention and competent follow-up service. ● With drawing and stamping capacity up to 250 tons; coining capacity to 400 tons; automatic press feeds, tool and die facilities; modern slitting and shearing equipment and wide range of raw material inventory—we can be a most important source for you today.

See our operating display in our Booth H-306 at the National Metal Congress in Detroit on October 15 to 19.



MODEL 650 "DE-STA-CO" HEAVY DUTY PLUNGER CLAMP

One of six styles and sizes of fast acting, positive locking plunger type clamps for "push-pull" production work-holding jobs where considerable pressure is required. Powerful toggle action and rugged construction offer up to 4000 lbs. capacity holding pressure. Send for 32-page catalog of "DE-STA-CO" Toggle Clamps illustrating entire line of more than 40 models.

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DETROIT STAMPING COMPANY

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☐ Please quote on "Multi-Slide" production of enclosed part print or to specifications attached.

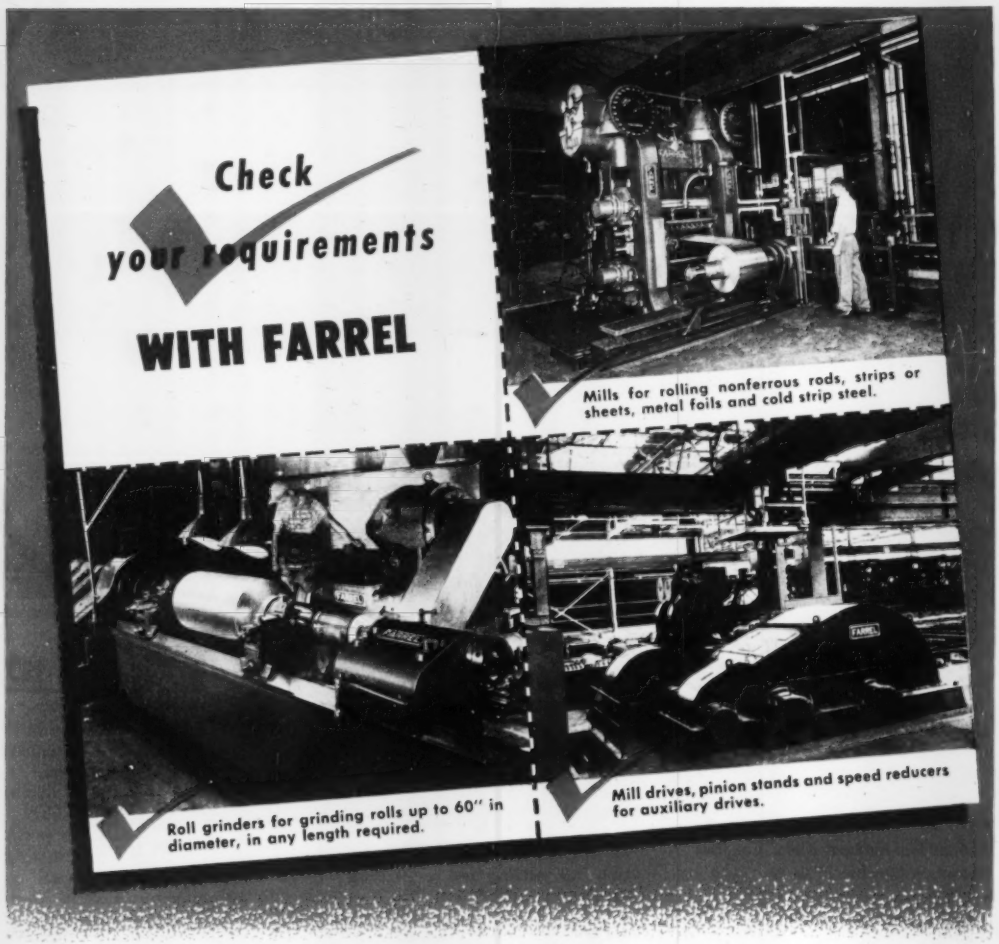
☐ Send name of nearest representative for my source file for small to medium-heavy stampings in production quantities.

Name_____

Company_____

Address_____

City_____ Zone____ State_____


Check
your requirements
WITH FARREL
Mills for rolling nonferrous rods, strips or sheets, metal foils and cold strip steel.
Roll grinders for grinding rolls up to 60" in diameter, in any length required.
Mill drives, pinion stands and speed reducers for auxiliary drives.

For close to a century, Farrel has specialized in designing rolling mill equipment for the solution of specific production problems.

Mills are built in a wide range of types and sizes for rolling nonferrous rods, strips or sheets, metal foils and cold strip steel. The company also designs and manufactures the reduction gear drives and pinion stands, coilers and special handling equipment required to make each installation a complete production unit.

Speed reducers for auxiliary drives are available in a wide range of ratios and capacities. Designs include single, double and multiple reduction units; speed-change units; right-angle drives and drives to meet special requirements.

Another problem solver is the Farrel roll grinder. Available in two types and nine standard sizes, these machines enable you to fix and maintain definite standards of accuracy and finish. Rolls are produced with a perfect surface, free from marks of any kind, ground straight, or with concave or convex contours of exact symmetry and accuracy.

Information and engineering consultation regarding any of the products mentioned on this page are available, without obligation.

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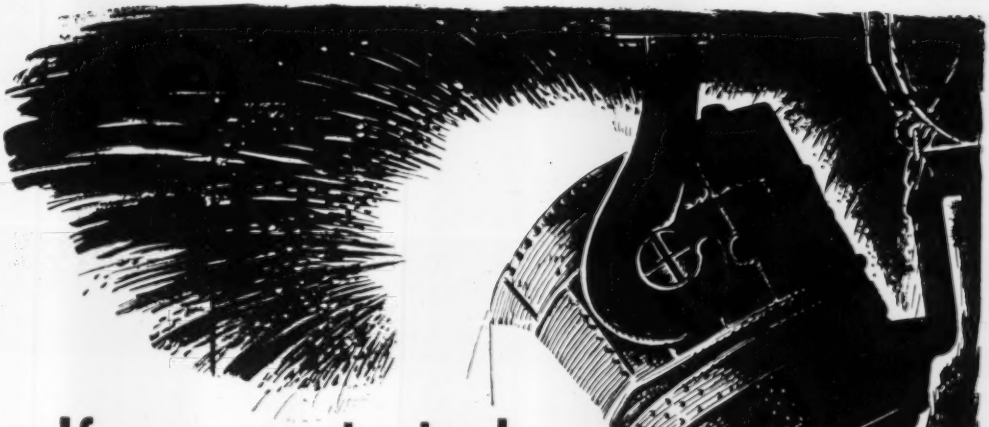
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Pittsburgh, Chicago, Los Angeles, Houston

Farrel-Birmingham

FB-700



If you want steel

sell Scrap now!

Steel production is at its peak . . . but the scrap that's needed to maintain production is at a new low. Get your iron and steel scrap in now!

For tanks, guns and armored vehicles . . . for all types of civilian uses . . . the nation *needs* steel and the nation is *getting* steel. But steel production is *going to slip* . . . unless you help make more iron and steel scrap available!

The figures tell the story! Each ton of ingot steel requires up to a half-ton of scrap . . . and over 100 million tons of ingot steel are being produced annually. That's why *all* the scrap iron and steel around your plants and yards should be sold now to scrap dealers who will get it moving to the steel mills.

If you use steel—need steel—the surest way of having steel available is to get in your scrap. Start your clean-up drive today!

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

ATKINS

BAND SAWS

for *Profitable* **Metal Cutting**

Atkins *"Silver Steel"* band saws, specifically designed for faster cutting and longer life, are expertly heat treated, accurately milled and quality controlled. Field Engineers, operating from our Research and Development Department, are available to solve your metal cutting problems. Simply request their services through an Atkins *"Silver Steel"* Distributor, who can serve you from stock with standard band saws covering every requirement.

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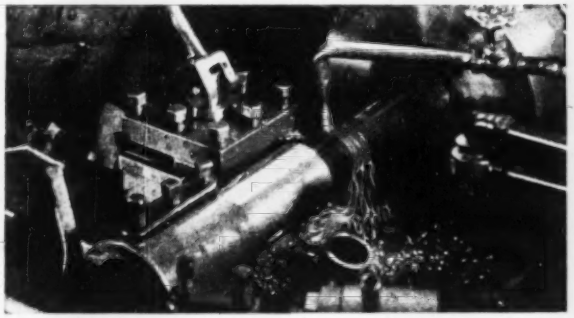
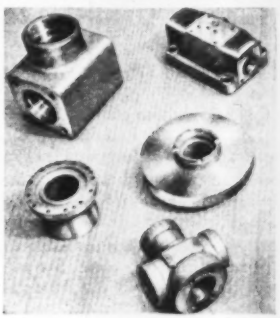
WITH WORK THAT'S "HARD TO CLEAN"

VAPOR DEGREASING CAN CUT YOUR COSTS . . . MINIMIZE REJECTS



REMOVES CUTTING COMPOUNDS... After machining and before inspection, shafts are thoroughly and rapidly degreased. The same degreasing equipment is also used to clean rough metal stock before it is put on the lathe.

OR HEAVY GREASE . . . Grease used in storing parts comes off quickly and completely in a vapor degreaser. One hydraulic equipment plant uses six different degreasers to clean parts of all sizes, shapes and metals.



Metals are cleaned... quickly... when you use vapor degreasing with Du Pont Trichlorethylene. It reaches into deep holes and other inaccessible places to dissolve grease and oil—often in less than a minute.

Vapor degreasing helps cut down rejects. *All* the grease and oil, plus loose metal filings, rust and abrasives, are removed . . . with less handling of delicate parts. Work comes out of the degreaser clean and dry, immediately ready for the next step.

Companies in all phases of metalworking use this fast, safe, efficient process. Plants expanding production or doing metal cleaning for the first time find vapor degreasing especially applicable.

You can obtain vapor-degreasing equipment of almost any capacity . . . for manual or conveyorized operations. And it can be easily installed at any step in your production sequence. Get the facts today by sending the coupon below.

Du Pont Degreasing Solvents have been widely used for many years and are available under various trade marks, such as "Triclene" D.

These solvents are stable . . . stand up against contaminating and destructive materials . . . are the best yet developed by Du Pont for metal degreasing.

non-flammable DU PONT SOLVENTS for VAPOR DEGREASING

SOLD NATIONALLY THROUGH DISTRIBUTORS

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Mail the coupon below for more facts on vapor degreasing.

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept., Wilmington 98, Delaware

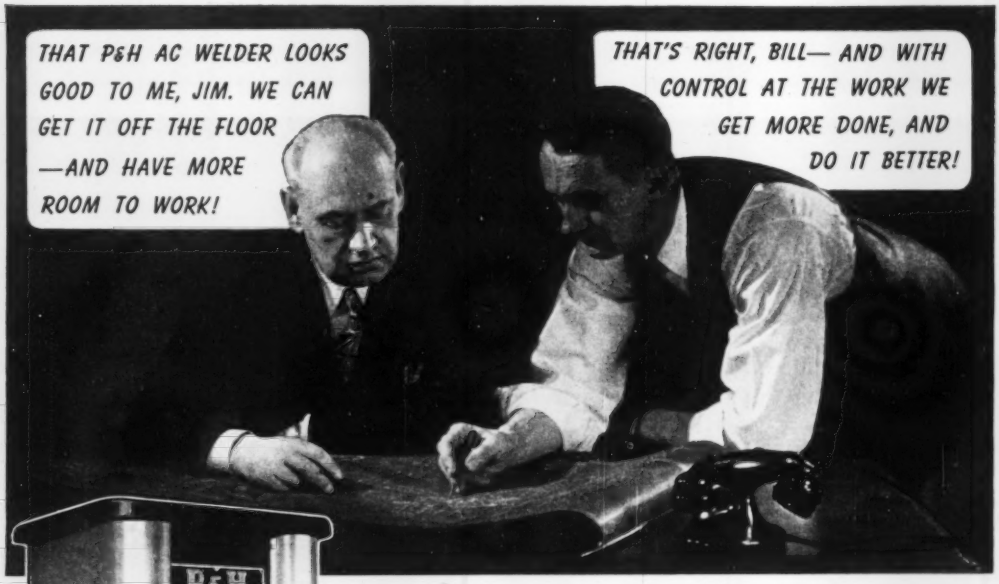
Please send me detailed information on Vapor Degreasing: applications, advantages, equipment used, and Du Pont solvents available. We are interested in cleaning _____ products.

*Name*_____ *Position*_____

*Firm*_____

*Street and No.*_____

*City*_____ *State*_____


THAT P&H AC WELDER LOOKS GOOD TO ME, JIM. WE CAN GET IT OFF THE FLOOR —AND HAVE MORE ROOM TO WORK!
THAT'S RIGHT, BILL— AND WITH CONTROL AT THE WORK WE GET MORE DONE, AND DO IT BETTER!

Save floor space, cut welding time for more production at lower cost

. . . . use P&H AC Arc Welders with exclusive Dial-lectric remote control

Give yourself more room for your production needs. Mount your P&H Welder off the floor, out of the way.

Dial-lectric remote control lets you do this. Your operator can turn the heat on *at the work*. It also cuts down his "walking time" . . . turns it into *welding* time for increased output.

Besides saving space P&H Dial-lectric control eliminates cores, coils, sprockets, gears and other moving parts that cause excessive maintenance and downtime.

P&H AC Welders are available in a full range of sizes up to 625 amps. See your P&H representative or distributor for full details on how this outstanding welder can save you time and money.

P&H

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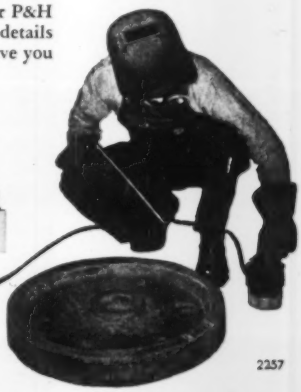
Excavators • Overhead Cranes • Hoists • Arc Welders and Electrodes • Soil Stabilizer • Crawler and Truck Cranes • Diesel Engines • Cane Loaders • Pre-assembled Houses



2257

Specialized Training

Metal Welding Fabrication

1 week to 18 months

Harnischfeger Welding Training School

in conjunction with

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See Actual Demonstration

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Metal Show
Detroit
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Building H
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You can CUT Assembly TIME and COSTS *and improve product performance*

● Eaton Springtites (Reliance Helical Coil Spring Lock Washers pre-assembled on bolts or screws so they rotate freely under tightening torque and can't come off) and Sems (multi-tooth washers similarly pre-assembled) save five or more motions in bolting assemblies — reducing assembly time and costs correspondingly.

● Of added importance—they provide complete nut thread engagement and full-nut bearing to insure against "pull through" and thread damage.

● The non-fatiguing spring steel sections of the washers also keep bolted assemblies on your product *tighter longer*, safeguarding your reputation and maintaining customer good will.

● Your nearest Eaton-Reliance sales office will be pleased to show you just how much you can save with Eaton Springtites and Sems.

Springtites and *Sems*

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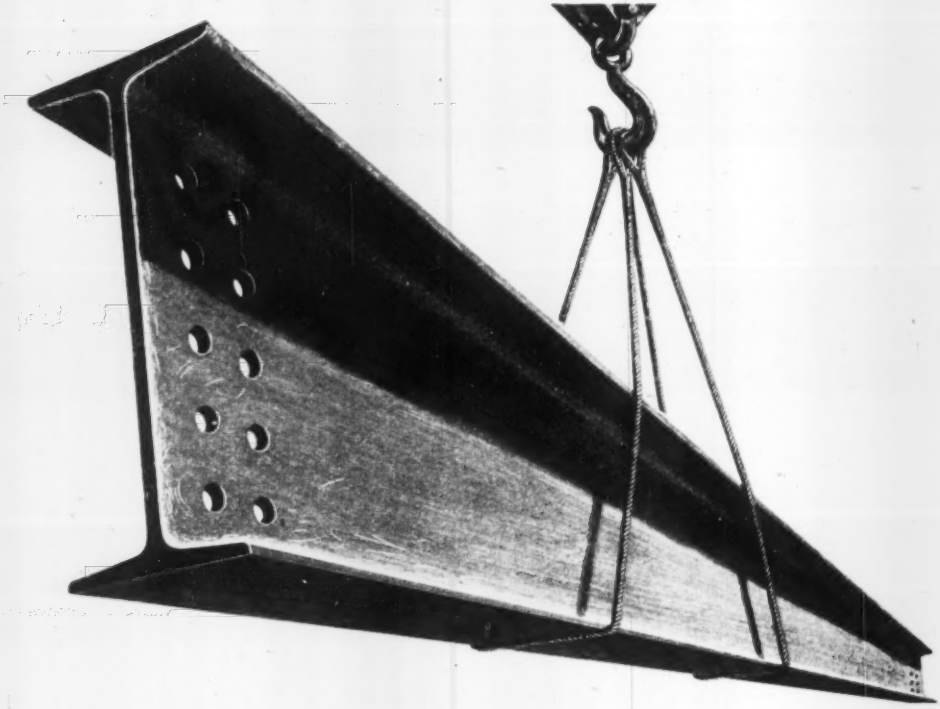


Essential to a $23,900,000,000 program!

Twenty-three billion, nine hundred million dollars—that's the estimated sum American industry will spend in 1951 on plant expansion and defense equipment.

An immense amount of steel is going into this program, which naturally gets first call. But at the same time Kaiser Steel is supplying steel to western manufacturers of essential *civilian products.*

This is possible because of a consistent expansion program, one which has increased Kaiser Steel's capacity to 1,380,000 ingot tons per year. Nearly 2½ times the amount produced in 1944, the peak war year!

More evidence that the West Coast's only integrated, *independent* steel plant is helping to build a stronger West . . . and a stronger nation!

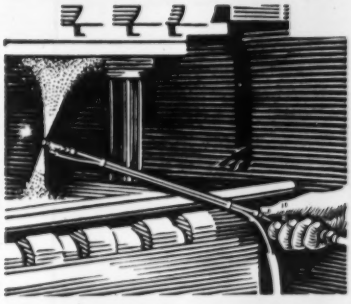
It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet • alloy bars carbon bars • structural shapes • cold rolled strip • cold rolled sheet • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

NO SMOKE... NO FUMES in Hot Forging with... "dag" Colloidal Graphite



"Dag" colloidal graphite dispersed in water eliminates smoke and fumes in hot forging operations . . . greatly improves working conditions. The lubricating properties of colloidal graphite are superior, too, giving increased production . . . reduced die wear . . . better finish . . . and usually a saving in steel stock.

The uses of **"dag"** colloidal graphite for hot forging operations are fully explained in a specially prepared article entitled "Forging Die Lubrication". Copies are available without obligation. Write today to Acheson Colloids Corporation, Port Huron, Michigan, for Bulletin #750-21K.

dag
DISPERSIONS®

Acheson Colloids Corporation

Port Huron, Mich.

...also Acheson Colloids Limited, London, England

J&L STEEL

TURN IN YOUR SCRAP — HELP BALANCE STEEL PRODUCTION!

You have some of the Mesabi Range cluttering up YOUR plant!

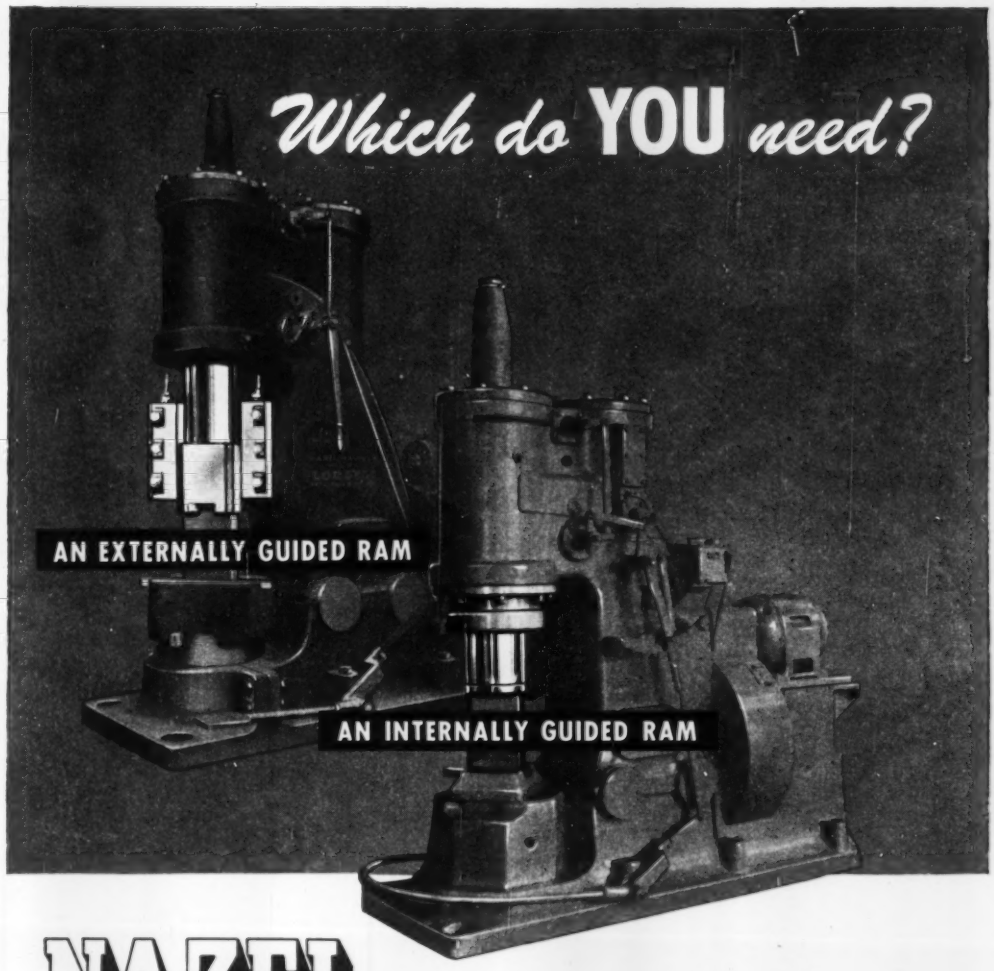
The iron and steel scrap in *your* operation—old machinery, parts, fixtures, etc.,—is worth twice its weight in precious Mesabi iron ore. Today this scrap is a vital natural resource. *Maximum steel production is impossible without it.* Every pound of scrap you can salvage is needed to help meet today's record demand for the steel to build a strong defense and to meet civilian needs.

COMB YOUR OPERATION FOR STEEL SCRAP NOW!

No matter what business you're in, you probably have more scrap than you realize. Appoint a responsible man to round it up. Set a date to have the job done. Your local scrap dealer will pay you for the scrap you collect. He'll speed it back into production. Act now. The need is urgent.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Which do YOU *need?*



NAZEL ELECTRO-PNEUMATIC ARE MADE IN BOTH TYPES

Whether you need a hammer with an externally guided ram or one with an internally guided ram and large clear working space, there's a NAZEL for your job and, remember, a NAZEL is ready to work at the touch of a switch. There is no waiting for power.

LOBDELL UNITED COMPANY

1836 WILMINGTON 99, DELAWARE 1951

A SUBSIDIARY OF UNITED-ENGINEERING AND FOUNDRY COMPANY

Homestead-Reiser
Self-Seald
LUBRICATED PLUG VALVES

The *Full-Port-Area* Valve built to outlast all other lubricated plug valves in the 200 pound working pressure class.

- **100% PORT AREA**
- **100% LUBRICANT SEAL AROUND PORTS**
- **SELF-SEALING**
- **AUTOMATIC ADJUSTMENT FOR WEAR**
- **EXTREME ECONOMY OF LUBRICANT**

Remains drop-tight for
Up to 22 TIMES
more operations
without Re-lubrication

Self-seald MEANS

. . . that in addition to a full-port lubricant seal, the wedge action of the plug under line pressure, forces the surfaces of the plug outward, and constantly presses against the seating surfaces of the body, keeping them always in intimate contact. The plug automatically adjusts itself for wear, assuring extra long life, maximum leakless service, and lubricant economy.

Write today for Reference Book 39-Section B.

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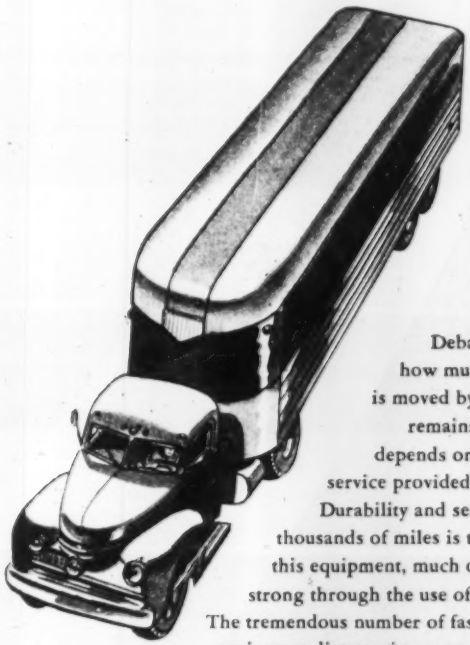
Serving since 1892

P. O. BOX 22 CORAOPOLIS, PA.

Mile After Mile . . . "

Wherever roads stretch over the countryside linking village, town, city, seaport—there you will find the familiar welcome sight of the Truck-Trailer.

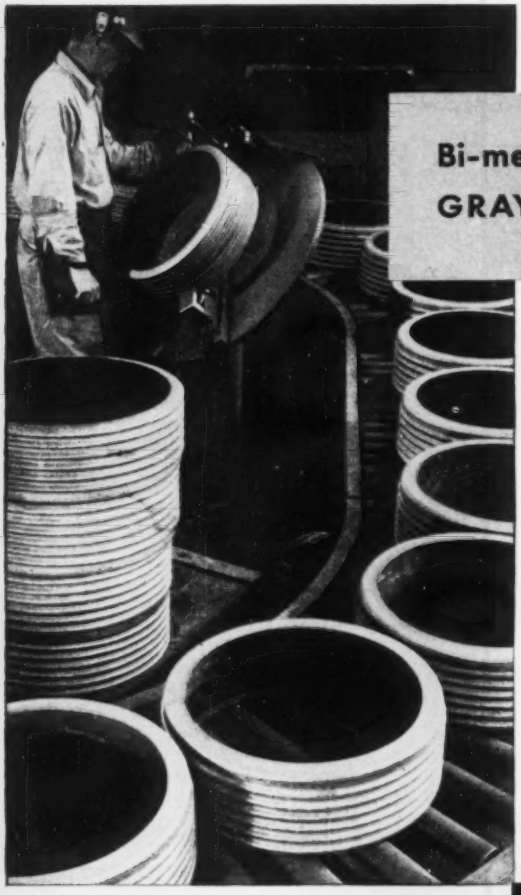


Debate may wage warm as to how much of the nation's freight is moved by Truck-Trailer. The fact remains that much of the nation depends on the fast and economical service provided by these sturdy vehicles. Durability and service over thousands and thousands of miles is the accepted standard for this equipment, much of it assembled and made strong through the use of Sterling Bolts and Nuts. The tremendous number of fastenings required for this equipment dictates, in many cases, the selection of the Sterling Bolt Company as a primary source because Sterling Bolt, for more than 30 years, has been a dependable supplier of bolts and nuts to the volume production industries—and this includes the great Truck-Trailer Industry.

Sterling Bolt Company is a member of the Truck-Trailer Mfgrs. Association.

STERLING BOLT CO.

General Offices: 401 W. Erie Street
Chicago 10, Illinois
Cincinnati • Indianapolis • Milwaukee • St. Louis



Bi-metal Brake Drums prove GRAY IRON'S *Versatility*

In addition to its other useful characteristics, Gray Iron may be readily combined with other materials to achieve a wanted result.

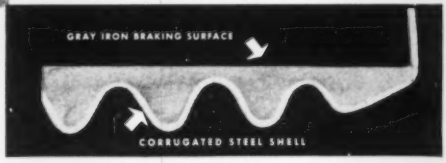
For example, brake drums for automotive and aircraft equipment require an internal braking surface with maximum wear resistance and heat dissipation.

To obtain adequate strength, save weight, and still provide the superior braking surface which Gray Iron assures, molten iron is centrifugally fused into corrugated steel shells (see inset). The result is a combination of excellent braking characteristics and unusual strength.

Perhaps *you* have a product design problem where Gray Iron's versatility can prove advantageous. Why not consult your local foundryman?

GRAY IRON Characteristics Include:

- Castability
- Rigidity
- Low Notch Sensitivity
- Wear Resistance
- Heat Resistance
- Corrosion Resistance
- Durability
- Vibration Absorption
- Machinability
- Wide Strength Range



Centrifugal casting process is used to form continuous bond between Gray Iron braking surface and steel drum shell.

Make it Better with Gray Iron

Second largest industry in the Metal-working field

GRAY IRON FOUNDERS' SOCIETY, INC.

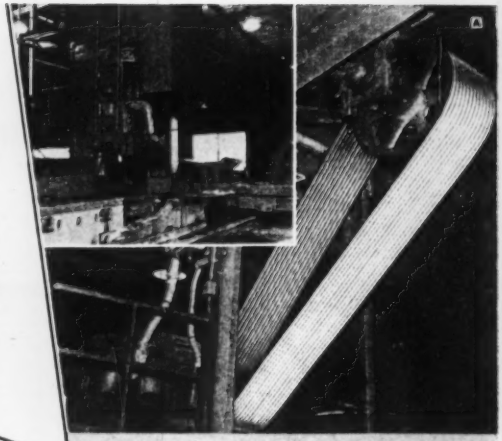
NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

ROLLS for ROLLING SLABS, BLOOMS and BILLETS

PITTSBURGH ROLLS

PITTSBURGH ROLLS DIVISION OF BLAW-KNOX COMPANY • PITTSBURGH, PA.

Prove for yourself why Gates Vulco Ropes are giving you longer V-Belt Wear!



This big bandmill, in the Masonite Corp. plant at Ukiah, Calif., is driven by Gates Vulco Ropes. The saw has a capacity of 200 thousand board feet of lumber in 8 hours.

There is a very simple reason why Gates Vulco Ropes—the V-belts built with *concave sides*—are giving you substantially *longer wear*—and you can easily prove this for yourself in just 2 minutes' time!

Pick up *any* V-belt whatever and bend it as it bends when going around a pulley. As the V-belt bends, grip its sides with your fingers—and here is what will happen, every time.

If the belt you are bending is a *straight-sided* V-belt, you can *feel* its sides *bulge out* as the belt bends. This out-bulge forces the sides of the belt to press *unevenly* against the V-pulley—as shown in figure 1-A (see accompanying diagrams).

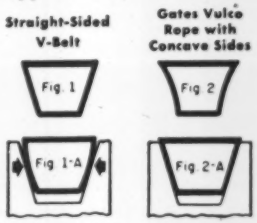
Clearly, this *uneven pressure* against the V-pulley causes the belt to wear *unevenly*—with the wear *concentrated* where the bulge is greatest—and this concentrated wear at one point naturally shortens the life of a *straight-sided* V-belt.

Now, make this same test with the belt that is built with Concave Sides—the Gates Vulco Rope!

Whereas you felt an *out-bulge* when you bent a belt with straight sides, you find that the *Concave Sides* merely fill out and become *perfectly straight*. The sides therefore *press evenly* against the V-Pulley. This distributes the wear *uniformly* across the *full width* of the belt. Naturally, this means longer belt life and *lower* belt *costs* for you!

Only V-Belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure that you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

Gates® Hose V-Belts Molded Rubber Goods for Industry

VULCO ROPE DRIVES

ENGINEERING OFFICES AND JOBBER STOCKS IN ALL INDUSTRIAL CENTERS

CS-5110

THE GATES RUBBER COMPANY • DENVER • U•S•A

World's Largest Maker of V-Belts

Waiting for you to set them in motion

. . . Ready to give you something *above* the ordinary in service on tool, alloy, or stainless steel. Look how they can help you:

There's the man on the order desk in your nearby Carpenter MILL-BRANCH WAREHOUSE. He's waiting to give you quick information on prices, sizes, and grades. There's the representative ready to help you with tooling and production problems. There's the crew of delivery men backed by time-saving equipment to get out emergency orders.

And there's more. For *every* man in your nearby Carpenter MILL-BRANCH WAREHOUSE, there are *hundreds more* in the Reading Mill waiting to work for you. That's the difference. For Carpenter's warehouses are MILL-BRANCH WAREHOUSES. Every time you call you have a direct line on Mill Laboratory and Metallurgical Help, Mill Quality and Uniformity—*comprehensive* Mill Service.

You'll find it's the *closest* thing to having a *specialty* steel Mill right in your own back yard!

Here's what *you* want in steel service. To discover how easy it is to get it, call Carpenter. Simply pick up your phone and call your nearest Carpenter MILL-BRANCH WAREHOUSE or Distributor. The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.

CALL Carpenter

for Mill-Branch Warehouse Service

SPECIALTY TOOL • ALLOY • AND • STAINLESS STEELS

New!

NOBODY BUT ARO

OFFERS YOU

Instant PUSH-BUTTON *Reverse*

Actual Size

A REVOLUTIONARY SCREW DRIVER and NUT SETTER

ARO's new push-button valve means *instant reverse action* . . . no need to remove from work . . . no stopping to turn levers . . . no wasted time.

Adjustable clutch (available with positive clutch). Length 7-11/16" . . . outside diameter 1-5/16" . . . weight 1.4 lb.

This outstanding tool must be seen in action to appreciate its amazing action. We will be glad to arrange an on-the-job demonstration.

ARO

AIR TOOLS

Also . . . LUBRICATING EQUIPMEMT . . . HYDRAULIC EQUIPMENT . . . AIRCRAFT PRODUCTS . . . GREASE FITTINGS

SEND

THE ARO EQUIPMENT CORPORATION, BRYAN, OHIO

I am interested in learning more about the new ARO Model 7500 Screw Driver and Nut Setter with *push-button reverse action* . . .

☐ Please arrange an on-the-job demonstration. No obligation.

☐ Please send literature.

Name_____

Company_____

Street_____

City_____ State_____

CARMET

can solve *YOUR* *Wear-Resistance* problem

● WHAT JOBS HAVE YOU FOR CARMET CARBIDES TO DO?

For maximum wear, save with Carmet—preformed to practically any shape or size! *Examples:* entire blanking die parts; inserts for drawing, heading, extruding and blanking dies; gauge and wear parts, pins, bushings, etc. *Supplied Preformed* —with minimum grind stock allowed, or precision ground and ready for use. Let us work with you . . . send us your drawings and specifications for quotations. ● *Allegheny Ludlum Steel Corporation, Carbide Alloys Division, Wanda and Jarvis Avenues, Detroit 20, Mich.*

For complete MODERN Tooling, call

Allegheny Ludlum

AL
FINE TOOL STEELS
SINCE 1854

W&O 3408

NEW Airco Oxygen Process reclaims nickel... chromium from stainless and high-alloy scrap

DURIRON COMPANY, of Dayton, Ohio, a well-known producer of corrosion-resisting alloys, wanted a method for reclaiming highly-critical nickel – and chromium – from their stainless and other high-alloy scrap. They wanted to re-use this tightly-allocated metal for making castings in their own shop.

W. T. Bryan, Duriron Co., and ***H. C. Linde***, Airco Technical Sales Representative, working together, used oxygen refining as a means of removing carbon from the alloy steel bath. On the basis of experience, it was found that the carbon removal was accomplished without excessive oxidation of chromium from the high alloy scrap charge. Equally important, all of the nickel charged was recovered. This permitted the foundry to reclaim all scrap.

The Duriron Company was highly pleased with these results, and have adapted this process as standard practice ... and, now produce low-carbon, high-alloy castings from material that otherwise would be useless to them.

For further information about this modern method for reclaiming high-priority nickel – and chromium – from your scrap, call or write your nearby Airco office for Technical Sales assistance.

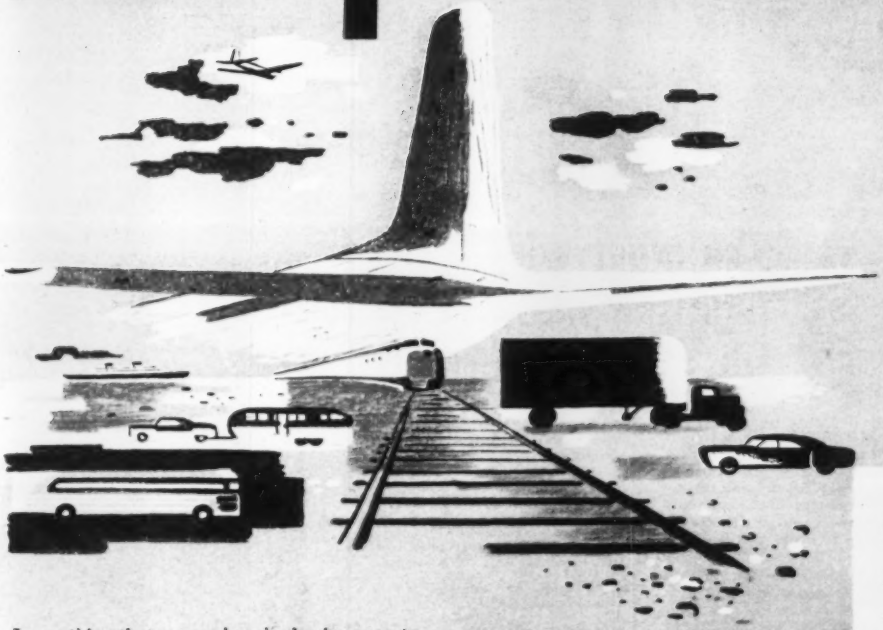
AIRCO

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

Van Huffel
cold-formed metal tubing and shapes
are proving their worth
in the vast field
of

transportation



In anything that moves, by wheel, wing or water, applications of Van Huffel metal tubing and shapes have become standard practice. Whether it is a frame for a modern trailer coach or an intricate part for a jet job, product engineers in the transportation field recognize the advantages in specifying Van Huffel whenever strength, style and simplicity . . . *plus economy* . . . are necessary characteristics of their products. Van Huffel means versatility.

VAN HUFFEL

TUBE CORPORATION • WARREN, OHIO

WELDED, LOCK SEAM, OPEN SEAM, BUTTED TUBING, SHAPES AND MOULDINGS

The most widely used high temperature block insulation for over a quarter century...

SUPEREX® high temperature block insulation has long been industry's No. 1 choice for service temperatures up to 1900F. It provides *major* economies . . . reduces fuel costs, cuts heat losses, keeps maintenance expense down, costs less to install and has long service life.

These are the reasons why 90% of the nation's hot blast stoves are Superex insulated . . . and why the low cost open hearth steel producers use Superex in their regenerators.

Made of specially selected and calcined diatomaceous silica blended with other insulating materials and bonded with asbestos fiber, Superex will safely withstand temperatures up to 1900F with negligible shrinkage.

Superex has been used with outstanding success in all types of industrial and metallurgical furnaces and ovens, stationary and marine boilers, auxiliary power plant equipment, regenerators, kilns, roasters, high temperature mains, flues and stacks.

Superex has all these important advantages...

Low thermal conductivity—Exceptionally high heat resistance (1900F) combined with excellent insulating value.

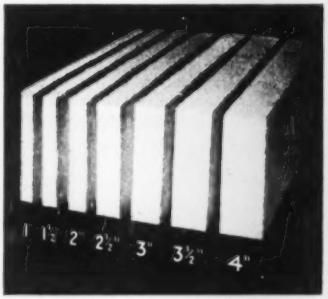
Light weight—Approximately 2 lb per sq ft per in thickness.

Great physical strength—Approximately 6 tons pressure per sq ft are required to compress Superex ¼ in.

Long, efficient service life—Superex maintains high insulating value indefinitely—will not disintegrate in the service for which it is recommended.

Fast, easy application—Superex may be cut with an ordinary knife or saw for fitting around openings or to irregular surfaces. Because of its light weight and convenient sizes, Superex assures fast and economical installations.

For complete information about Superex block insulation, write for Brochure IN-134A. Address Johns-Manville, Box 290, New York 16, N. Y. In Canada, write 199 Bay Street, Toronto 1, Ontario.

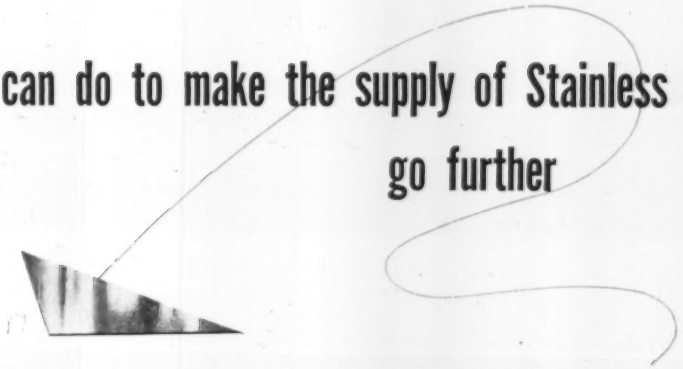


Waste is minimized with Superex because of the variety of thicknesses available. Special shapes and intermediate thicknesses between those shown are also available.

JOHNS MANVILLE JM PRODUCTS

Johns-Manville *first in* **INSULATIONS**

What you can do to make the supply of Stainless Steel go further



Indicate acceptable alternates in composition and gage wherever possible

Keep these points in mind, too, when you order Stainless

Tell your supplier exactly where you'll use Stainless Steel and how you'll fabricate it.

Minimize scrap losses at the mill by ordering the exact sizes you will use.

Make full use of the steel you get by keeping down scrap losses in your shop.

● To speed up deliveries of the Stainless Steel you need, it's important that you give your supplier as much latitude in filling your order as possible. That means specifying alternates in composition, gage and even finish wherever you can.

Alternate compositions are especially important. By government order, certain alloys including nickel, molybdenum, columbium and titanium, have been restricted as to end use. But in many cases, you may be able to obtain an alternate grade that will fit your fabricating and service requirements.

Familiarize yourself with government orders regarding the use of Stainless Steel and examine your requirements in light of these directives. If you need assistance in evaluating various grades, gages etc., our representative will be glad to help.

LOOK AHEAD

When ordering, anticipate your needs as far in advance as possible and advise the rate at which steel will be required. And, above all, turn in every pound of scrap to the mills as quickly as possible. It is needed urgently to keep new steel flowing to you.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · COLUMBIA STEEL COMPANY, SAN FRANCISCO
NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S STAINLESS STEEL

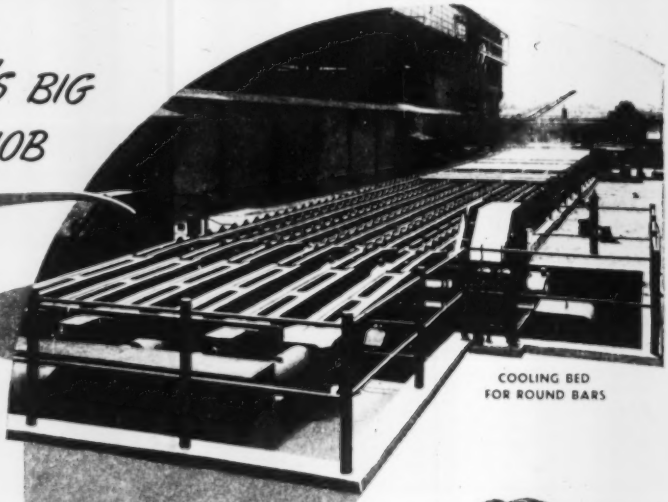
SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

1-1181

UNITED STATES STEEL

F&M makes "what it takes"

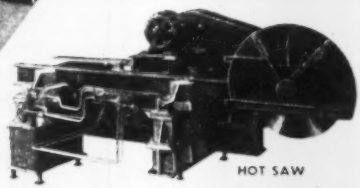
FOR INDUSTRY'S BIG PRODUCTION JOB



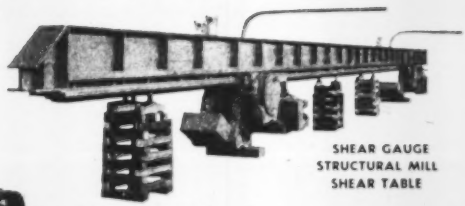
COOLING BED FOR ROUND BARS

F&M Products

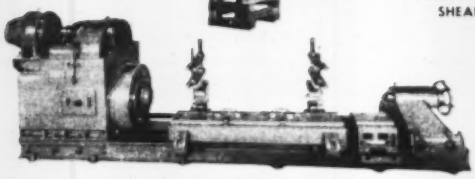
- PARALLOY ROLLS (PINCH, COILER, TENSION, STEEL MILL)
- HYDRAULIC SLAB AND BILLET PILERS
- STRIP AND SHEET OILING EQUIPMENT
- SHEET SCRUBBER AND CLEANING LINES
- HOT SAWS—ROCKING AND SLIDE TYPES
- HOT BEDS—COOLING BEDS—TRANSFERS
- BILLET EJECTORS—PINCH ROLL STANDS
- SLITTERS—SPECIAL SHEARS AND GAUGES
- TILTING TABLES—TRAVELING AND LIFTING TABLES
- CONTINUOUS PICKLING LINES—ROLLER LEVELLERS
- FURNACE CHARGING EQUIPMENT—FURNACE PUSHERS
- STRIP STEEL COILERS AND REELS—SCRAP BALLERS
- RAILROAD SPIKE FORMING MACHINES—ROLL LATHES
- SHEET GALVANIZING LINES—WIRE PATENTING FRAMES
- STRETCHER LEVELLERS—ANGLE AND SHAPE STRAIGHTENERS
- ROLLING MILL TABLES—GEAR AND INDIVIDUAL MOTOR TYPES
- DUCTILE CASTINGS (80,000 PSI)
- MACHINERY BUILT TO CUSTOMER'S DESIGN AND DETAIL DRAWINGS



HOT SAW



SHEAR GAUGE STRUCTURAL MILL SHEAR TABLE



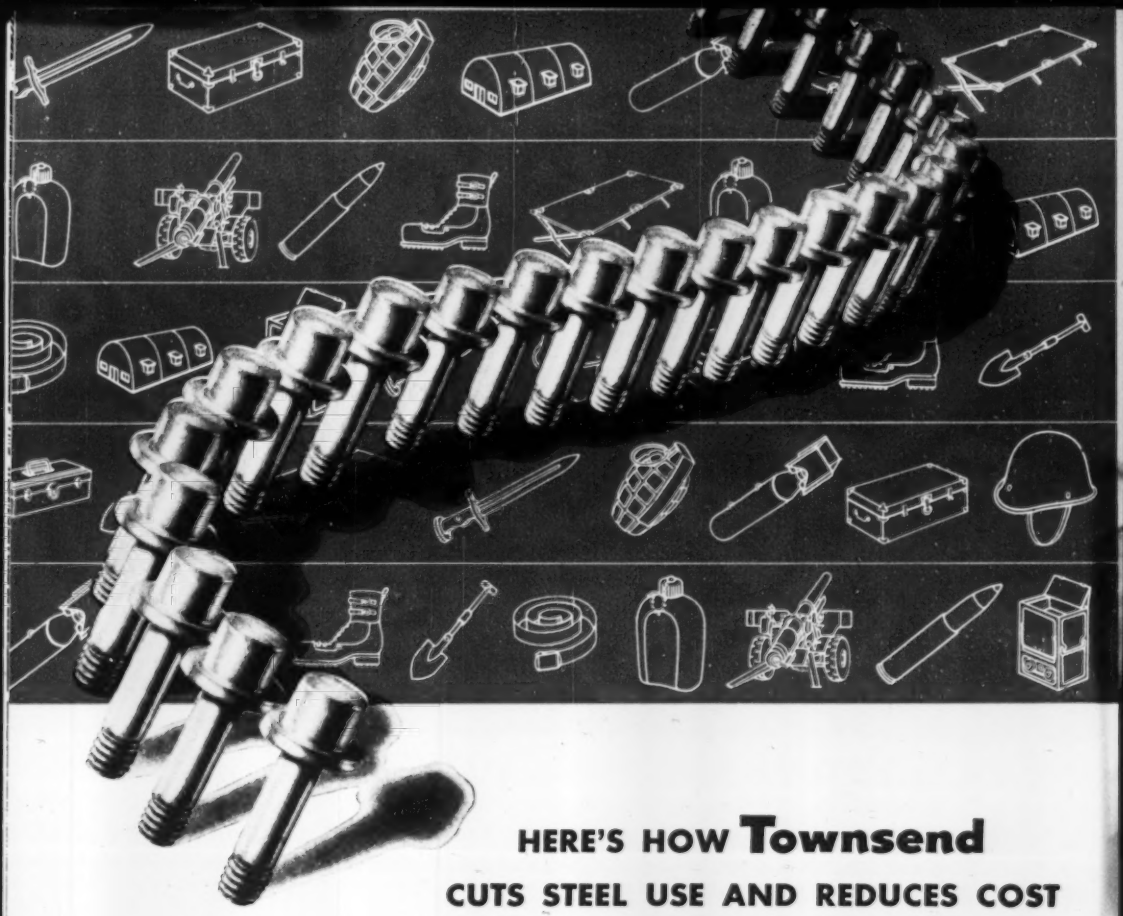
42 ROLL LATHE

The Youngstown Foundry & Machine Co.

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

Youngstown, Ohio

5



HERE'S HOW Townsend CUTS STEEL USE AND REDUCES COST ON THIS DEFENSE ITEM

The part shown above for use in a smokeless powder box was originally made from bar stock which wasted hundreds of tons of critical steel. Townsend engineers suggested that by a slight change in design the part could be cold headed from wire thus saving considerable steel and reducing the cost greatly. We are not permitted to reveal the number of parts made, but the aggregate savings both in money and steel was substantial.

This is typical of how Townsend saves time, money and material for customers by drawing upon its long experience in cold-heading to produce quality parts and fasteners with economy. When you work with Townsend in designing and producing military or civilian items you enjoy the benefit of this experience. Townsend products for defense range from hob nails for field boots to rivets for half tracks — from special nails for gliders to artillery firing pins — even balls for canisters.

To learn more about the savings in time, money and critical materials that are possible when you have Townsend design and produce your small parts and fasteners, write or phone today.

Townsend

COMPANY • ESTABLISHED 1816

Plants—New Brighton, Pa. • Chicago 38, Ill.

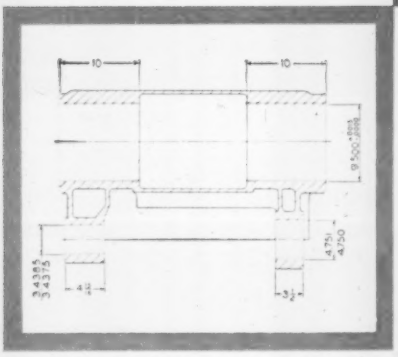
Cherry Rivet Company Division, Los Angeles, California

Sales Offices in Principal Cities

the jigmil technique

solves the problem

of small lot production at The Oster Mfg. Company Cleveland, Ohio



MACHINE—Model 3-B JIGMIL
PART—Spindle Head—Pipe Threading Machine
MATERIAL—Cast Iron

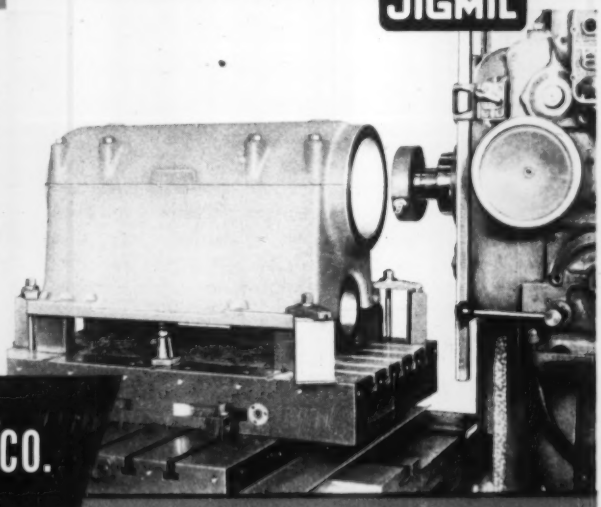
Sequence of Operations—With part mounted on standard JIGMIL Index Table,

1. Rough bore 9.500" diameter and face boss.
2. Finish bore 9.500" diameter and chamfer boss.
3. Rough and finish bore 4.750" diameter.
4. Index 180°.
5. Rough and finish bore 3.438" diameter.
6. Rough bore 9.500" diameter and face boss.
7. Finish bore 9.500" diameter and chamfer boss.

"IN LINE" bores are machined to Precise Limits of Alignment by means of the JIGMIL INDEXING PRINCIPLE.

- **All machining operations performed at one set up of workpiece.**
- **No Costly Line Boring Bars.**
- **No Boring Jigs.**
- ***Fast Production and High Accuracy.***
- ***Substantial Reduction in Assembly Costs.***

DEVLIEG JIGMIL



DEVLIEG MACHINE CO.

450 FAIR AVE., DETROIT 20, MICHIGAN

"no more GAMBLING on tool steel selection"

(½ actual size; Selector is in 3 colors)

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of *picking the right tool steel right from the start* is going over big.

"Handiest selector I've ever seen"

"No more gambling on tool steel selection"

"You're right, the application should dictate the choice of the tool steel" . . . and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock . . . that means when you get the answer, you can get the steel . . . fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!

And you're sure you're right!!

Crucible Steel Company of America
Dept. S, Chrysler Building
New York 17, N. Y.

Gentlemen:

Sure! I want my CRUCIBLE TOOL STEEL SELECTOR!

Name _____ Title _____

Company _____

Street _____

City _____ State _____

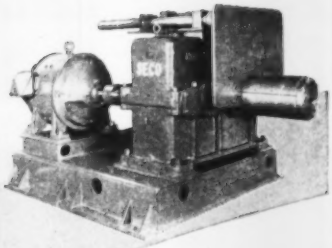
CRUCIBLE first name in special purpose steels

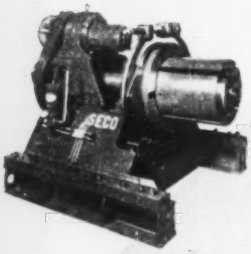
TOOL STEELS

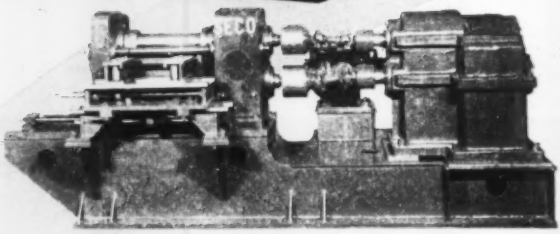
fifty-one years of Fine steelmaking

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DENVER • DETROIT HOUSTON, TEXAS • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH • PROVIDENCE ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.

YOU CAN SLIT 1/4" STEEL LIKE PAPER!





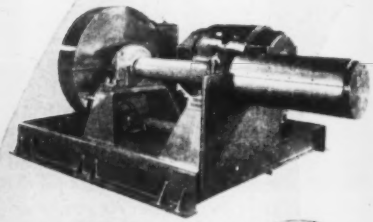


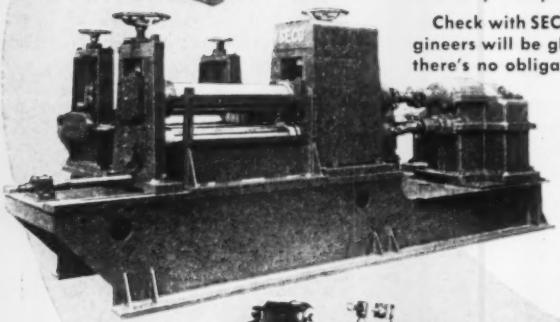
SECO SLITTING LINES HANDLE TOUGH JOBS — GIVE FAST, PROFITABLE PRODUCTION ON HEAVY STOCK

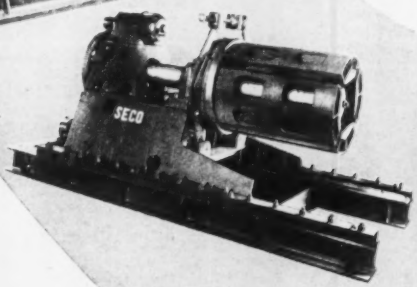
It takes plenty of rugged strength to slit 1/4" steel. But powerful, efficient SECO Slitting Lines can handle this tough job easily and quickly. Production is fast and profitable, with a minimum of down time.

Exceptional quality and accuracy are built into every piece of SECO equipment, large or small. The latest design and engineering features are included — to give you highest efficiency and years of trouble-free service.

Check with SECO today on your slitting requirements. Our engineers will be glad to talk over your problems with you — and there's no obligation on your part. Write for full information.







STEEL EQUIPMENT CO.

Designers and Builders of Steel Mill Equipment

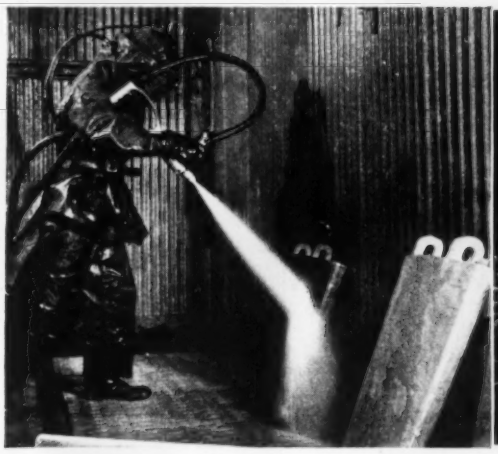
2890 EAST 83rd STREET • CLEVELAND 4, OHIO

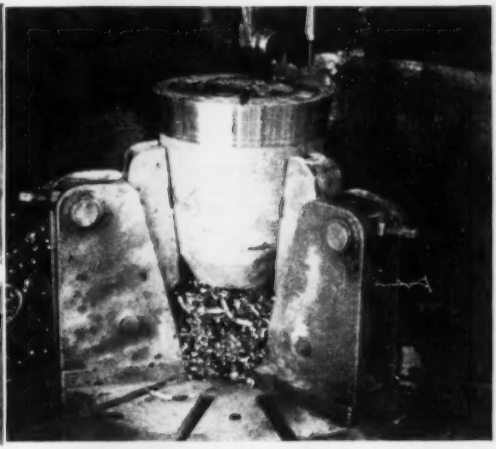
• Shown above are two heavy-duty SECO Slitting Lines capable of slitting steel up to 1/4" thick. The payoff reel, slitter and recoiler in the top three photos handle up to 20" width stock. The bottom three photos show a line of simplified design for slitting strip up to 42" wide. Both lines will handle up to 20,000 pound coils.

SECO

N-B-M Meadville . . . where the welcome mat is out. We're proud of this plant—its equipment and the skilled people who work in it. Proud enough, in fact, to offer a standing invitation to Blast Furnace Superintendents or other steel mill officials to visit us. When can *you* make an inspection trip?

Finished . . . with a finished touch





Here's where you'll find complete facilities for supplying copper castings with any finish specified.

Another reason why N-B-M Meadville is a name to remember when you specify copper castings. The photos above—showing copper castings in the process of being finished—typify the equipment at N-B-M Meadville . . . *complete* equipment for efficient production of castings in any degree of finish.

In these particular cases, all loose sand—both inside and out—is removed by hydroblasting, rather than rely on simply turning the casting upside down. The machined butt on N-B-M Tuyeres results in a better finish, a better fit—and more important, *helps prove soundness of the casting.*

From the molding floor to the shipping room, N-B-M Meadville accomplishes what should be, and is, the main objective of this modern, well-manned plant . . . ***What you specify . . . we ship.***

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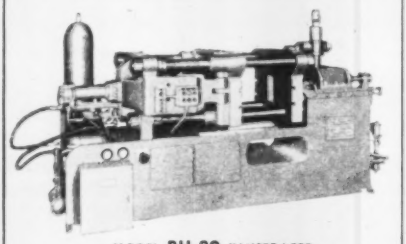

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Hydraulically operated die casting machine for production of zinc castings weighing up to 10 pounds.

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...The new Dormeyer Power-Chef performs all! To produce the die cast parts of this famous food-fixer demanded equipment of equal versatility and precision... And KUX • First Name in Die Casting Machines "delivered the goods" to perfection!

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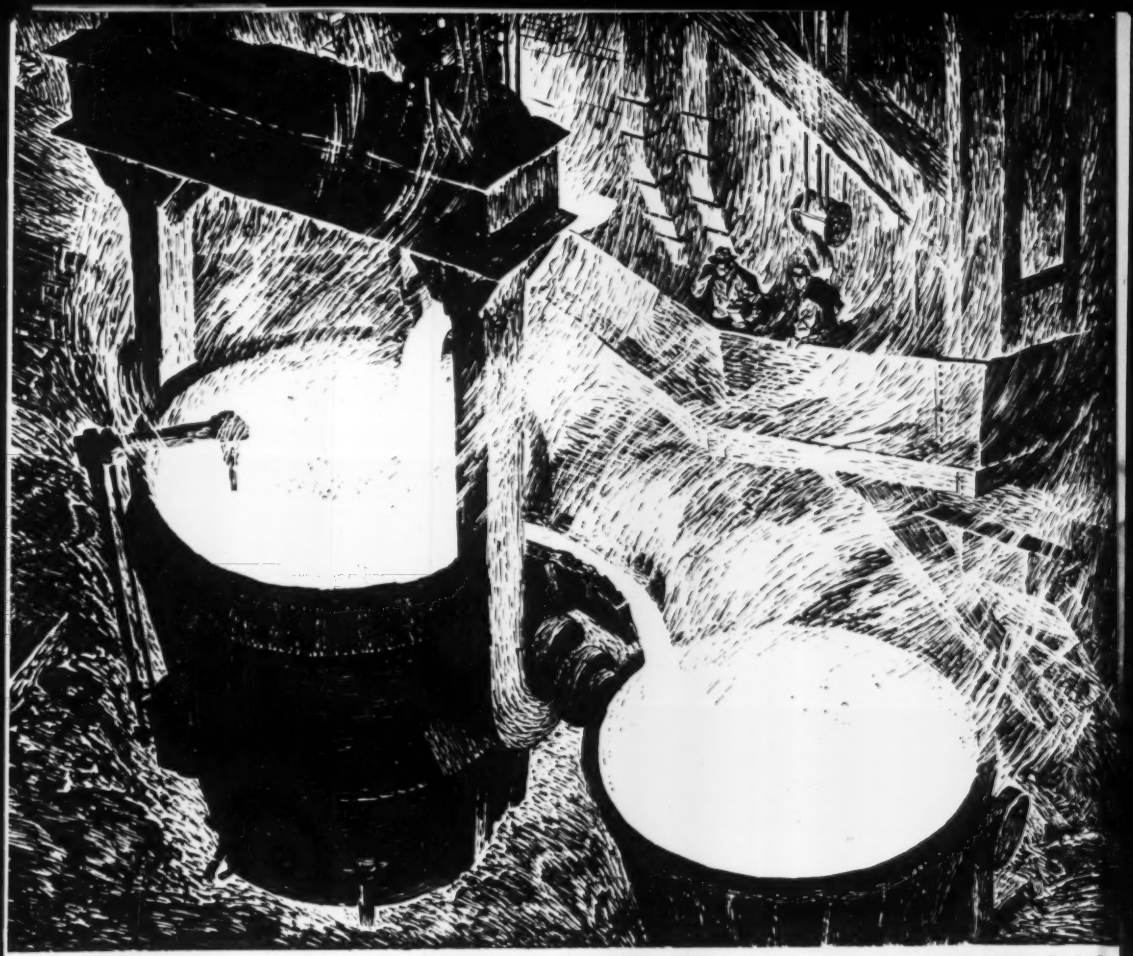


Tapping An Open Hearth — *From a Scratchboard Drawing for Pittsburgh Steel Company by William Pendred*

Progress in Steel

The tons of steel gushing from the open-hearth furnace above represents but a small part of the half-million-ton increase in steelmaking capacity that is steadily becoming a reality at Pittsburgh Steel Company. This increase means that fifty percent more steel will be made by Pittsburgh Steel and channeled into strip and sheet, tubular and wire products for the defense of the free world and to serve our daily lives.

A Program of Progress is making this expansion possible at Pittsburgh Steel. It is providing more iron from the blast furnaces—more steel from the enlarged open-hearth furnaces—a new blooming-slabbing mill—a new continuous strip-sheet mill—other finishing mills and facilities are being improved and enlarged as well.

Already the effect of this uncompleted expansion program is being reflected in the increased shipment of steel products from the works of Pittsburgh Steel. Each month records are being broken. Each month goals are being set even higher as the newly enlarged furnaces come into production. Each month Pittsburgh Steel moves closer to completion of its Program of Progress.

The acceleration of steel production in this unit of the vast steel industry is typical of the activity throughout the Nation today. Steel is needed for defense—steel is necessary in our civilian economy. The steel industry is determined to build so that all may have an ample supply of this vital metal.

Pittsburgh Steel Company

Pittsburgh, Pennsylvania

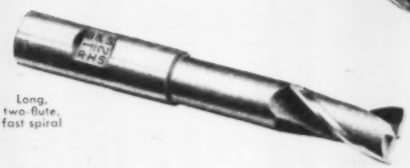
End Mills that Save Down-Time

Precision-made end mills that meet the highest standards of cutter design have advantages especially important in fulfilling today's high production requirements. They cut faster, more freely, and with less power. Their greater wearing qualities enable them to turn out more work between sharpenings — reduce machine down-time.

Brown & Sharpe End Mills are made under exacting quality control, from start to finish. In both steel formula and heat treatment, they are closely held to rigid specifications. Careful machining maintains consistent adherence to design standards.

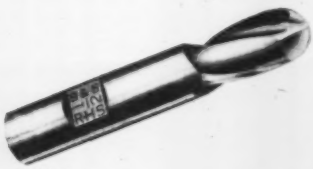
To assure maximum productivity from your milling machines, specify end mills and other cutters from the complete Brown & Sharpe line. Write for Catalog.
Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.

Extra-long, fast spiral



Long, two-flute, fast spiral

Fast spiral, double end



Ball end, two-flute, fast spiral

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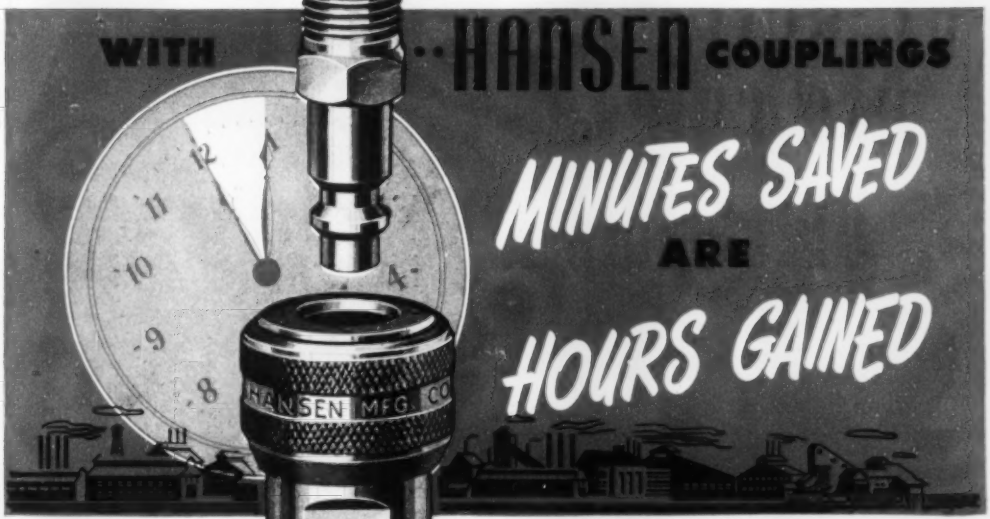

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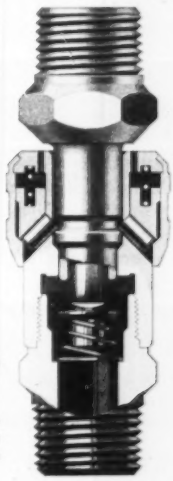
giving descriptions and sizes of complete Hansen line of straight through and shut-off couplings for hydraulic and pneumatic connections.



CONNECTION TAKES ONLY A SECOND

You save time with Hansen couplings every time you connect or disconnect a fluid line carrying gas, liquid or grease, because Hansen couplings connect or disconnect immediately—with instant automatic flow or shut-off.

To connect, merely push plug into socket—flow starts instantly. To disconnect, pull back sleeve on socket—coupling disconnects and automatically shuts off flow.

From a wide range of available sizes and types, you can select a Hansen coupling—one-way shut-off, two-way shut-off, or straight through type—each engineered for your specific application.

If you have any fluid lines in your plant, you can increase efficiency, save precious minutes, by the use of Hansen Couplings.

QUICK CONNECTIVE FLUID LINE COUPLINGS...

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we never use rule of thumb . . . .

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WICKWIRE WIRE . . . . . .

RULE OF THUMB plays no part in the scheme of things at Wickwire. Close laboratory control over the quality of Wickwire Wire . . . testing and inspection through every stage of manufacture involves precision instruments and equipment of hair-splitting accuracy.

Because Wickwire quality control is complete and uninterrupted from actual steel making to finished wire, you can depend on Wickwire Wire for constant adherence to rigid standards of uniformity in quality, size, tensile strength and stiffness.

Let us know your needs in specialty steel wire. We are prepared to meet your most exacting specifications for wire of high or low carbon steel . . . round or shaped . . . in all tempers, grades and finishes.

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Yes . . . dependable . . . rugged . . . and versatile! Lindberg Induction Heating Units are designed and built to operate under rigid production requirements far beyond the usual capabilities of Induction Heating Equipment. Like the bloodhound who never quits the trail, these units will serve you 24 hours a day . . . day after day . . . month after month.

Plants throughout the nation report dependable, versatile operation—fast, accurate, selective heating—on tiny pins—on mammoth gears —controlled in both depth of penetration and area covered. Investigate the Lindberg Induction Heating Units—you will profit from their rugged ability to deliver 24 hour a day operation. Ask for Bulletin 1440.

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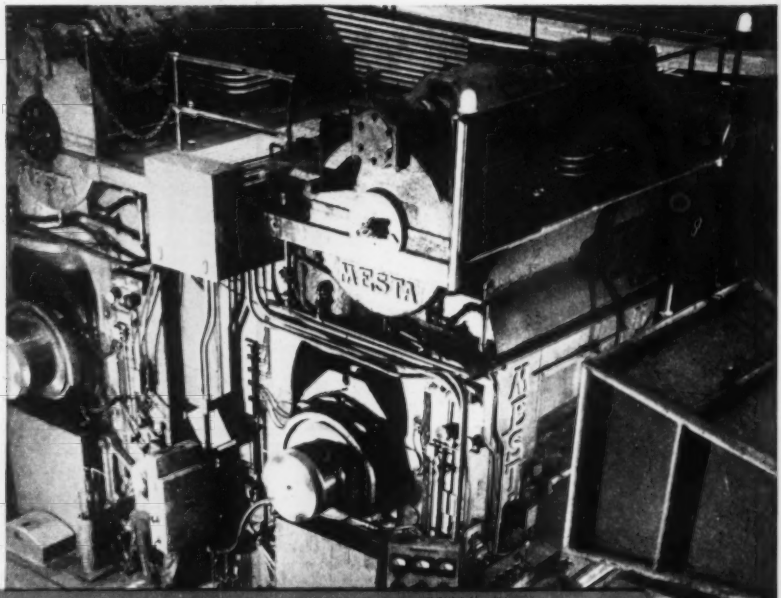

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. . . when oil film roll necks are lubricated with TEXACO REGAL OIL

For uninterrupted production, lubricate oil film backup roll necks with *Texaco Regal Oil*. This heavy-duty, turbine-grade oil forms a tough oil film . . . keeps circulating systems clean . . . assures a constant flow of cool, clean lubricant to the bearings. Operation is smoother, quieter . . . bearings last longer . . . maintenance costs drop.

There is a complete line of *Texaco Regal Oils*, all of which resist oxidation, emulsification and sludging, and carry heavy loads under all operating conditions. Join cost-conscious operators everywhere, switch to *Texaco Regal Oil*—your best bet for higher efficiency . . . lower maintenance costs.

In enclosed reduction gear drives, use *Texaco Meropa Lubricants*. They resist oxidation, will not foam . . . assure longer gear life and lower maintenance costs.

A Texaco Lubrication Engineer will gladly help you increase efficiency and cut costs throughout your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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TEXACO Regal Oils

(HEAVY CIRCULATING OILS)

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

The Metalworking Outlook

October 8, 1951

The Future of Controls

Economic Stabilizer Eric Johnston says direct controls over prices and wages can be lifted within the next two years—if all goes well. Officials in charge of materials controls aren't so optimistic. Defense Production Administrator Manly Fleischmann sees the present garrison economy lasting "10 or 12 years." In recent public statements he has been avoiding making any estimates on how long distribution curbs would remain.

Fingers Crossed

Don't expect much individual help from the government if you can't cash your fourth quarter CMP tickets for steel. NPA figures that its new ruling cutting off quarterly allocations if they haven't been delivered within seven days after the quarter is over should be sufficient help to fourth quarter ticket holders in that mills in these next three months won't have to worry about carryovers from old allotments. Complaints about CMP ducats are still coming in, but NPA isn't guaranteeing a thing.

NPA Plays It Cagey

Here's one reason why NPA is being cagey about guaranteeing any tonnages: It wants to encourage buyers to continue using conversion steel even though it's expensive and counts against allocations. If consumers were guaranteed regular mill tonnages, they would drop conversion material tomorrow. NPA believes conversion must be continued to help the tight supply situation. The agency's position is a delicate one because the line where conversion ends and gray market begins is hazy. In the works is a new order on conversion steel.

Reluctant Approval

Wage Stabilization Board is unhappy about a higher wage ceiling being considered for the tool, die, jig and fixture industry, but it will probably approve it. Tool and die people, few of whom have any pension plans or cost-of-living arrangements, have been losing their workers to employers who have such provisions in their contracts. The higher ceilings are designed to forestall pirating in that basic industry. For that reason, WSB will give its reluctant approval.

Machine Tools: Chance for Subs

Watch for more subcontracting opportunities from the machine tool industry. Just getting under way is the plan to boost tool production. Major subs thus far let include Bullard Machine Co.'s award to GM's Fisher Body Division to build vertical turret lathes, National Acme Co.'s

Production-Engineering News—p. 115 The Market Outlook—p. 261

award to American Machine & Foundry Co. to make automatic bar machines and Warner & Swasey Co.'s award to Harris-Seybold Co. to produce chucking machines.

On Copper and Aluminum

The outlook for copper supplies is as grim as ever; aluminum prospects are better. Although we can't get enough copper now, many copper people believe that the present output of domestic ores can't be maintained in 1952-53, because of dwindling resources. Ironically, we have excess copper refining capacity today. Rain in the Pacific Northwest means more electric power and consequently more aluminum from that area. Much of the aluminum capacity expansion should be coming in by the second quarter of 1952. Planned is a 90 per cent increase in aluminum production that will make the total capacity enough for both the military and civilians, barring an allout war.

Materials Use: Peak in 1952

The peak take of all materials by the military will occur in the second quarter of 1952. Consumption will level off from then on—unless a revised guided missile and aircraft program comes about, and then the whole picture would change overnight. The idea is to equip the military for one year of war. The basic material stockpile objective is five years, but we're far short of the goal.

New Deal in Industrial Architecture?

Watch for an evolution—perhaps even revolution—in design of industrial plants. The trend is just starting to build facilities that could easily be adapted for either war or peace production. Strong advocate of the dual-purpose facility is GM's C. E. Wilson. Coming may be new architectural standards, sponsored by government, for factories to be built in the future.

Straws in the Wind

Warehouse steel allocations in the first quarter of 1952 for farm equipment manufacturers will probably be 100 per cent of the base period . . . Government lost a good man and industry gained one when James Boyd, after a series of disagreements with Interior Secretary Oscar Chapman, left Washington for Kennecott Copper Corp. . . . Final CMP allocations for the first quarter should be ready by Oct. 15 . . . Structural steel users could use 220 per cent of the available material in the first quarter.

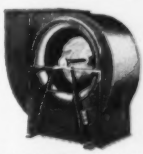
What Industry Is Doing

Business prospects are good for all except manufacturers with little or no defense work (p. 87) . . . A committee will study "birthmarking" alloy steels for better identification (p. 87) . . . High cost and scarcity of labor is helping to lift 1951 sales of industrial trucks to double the 1950 level (p. 88) . . . Bridgeport Brass Co. is going to start converting aluminum ingots into finished products (p. 89) . . . American users may get more industrial diamonds (p. 98) . . . A new allocating system for selenium is now in the works (p. 99) . . . Progress in getting government contracts is fairly good for defense production pools (p. 99).

PUTTING *Air* TO WORK FOR ALCOA

Axiflo® Fans develop ample pressure to perform efficiently in duct systems and discharge against strong winds.

In Elbow Axiflo Fans, motors, belts and bearings are located outside the air stream, an advantage in handling corrosive fumes.



Silentvane® Centrifugal General Purpose Fans move air efficiently and quietly for many industrial and commercial applications.

BIG BREEZE

SOAKS UP 300° IN A HURRY

These 100-foot strips of structural aluminum are getting an air bath that sponges off 300° F. . . . but fast. A concentrated blast of air quenches the hot shapes leaving the forming mold . . . cools continuously for over 100 feet as they move down the line.

Mounted overhead are 17 Sturtevant Axial Flow Fans, delivering quenching air that helps maintain mechanical properties in the aluminum through quick, even cooling. These large capacity fans supply a steady stream of cooling air at high efficiency. Result: a uniform product for ALCOA.

There's Westinghouse equipment ready to help you *put air to work* too . . . whether it's with air handling, air conditioning, or electronic air cleaning. Call your local Westinghouse-Sturtevant office for full details, or write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Massachusetts.

YOU CAN BE SURE...IF IT'S

Westinghouse

J-80226

Need an alternate for type 347 stainless?

WHAT TESTS SHOW. These welded specimens were exposed to a nitric-hydrofluoric acid etch test. The sample on the left is regular Type 304; on the right is a specimen of Armco Type 304 ELC. The area adjoining the weld in Armco ELC shows no evidence of attack, but the regular Type 304 fared badly near the weld.

If your welded products are exposed to service temperatures under 800 F., here is a grade of stainless steel you can often use in place of Type 347.

It is Armco Type 304 ELC Stainless Steel (Extra-Low Carbon, .03% maximum). This extremely low carbon eliminates costly corrosion alongside weld areas when it is due to the heat effects of welding.

The addition of columbium as a carbon-stabilizer *is not needed* with Armco Type 304 ELC. Its low carbon content accomplishes the same purpose—*at less cost.*

Write for complete information.

Typical Mechanical Properties

Armco Type 304 ELC and Armco Type 316 ELC (Not to be used in specifications as minimum values)

		SHEETS AND STRIP				PLATES			
Type	Condition	Ultimate Tensile Strength psi	Yield Strength 0.2% Offset psi	Elongation % in 2"	Rockwell Hardness	Ultimate Tensile Strength psi	Yield Strength 0.2% Offset psi	Elongation % in 2"	Rockwell Hardness
304 ELC	Annealed	85,000	35,000	55	B80	85,000	30,000	60	B80
316 ELC	Annealed	90,000	40,000	50	B85	85,000	35,000	60	B80

Armco Steel Corporation

3991 Curtis Street, Middletown, Ohio • Plants and Sales Offices from Coast to Coast • Export: The Armco International Corporation

ARMCO STEEL

Free World Fraternity

Next week thousands of persons identified with metalworking will converge on Detroit for the 33rd National Metal Congress and Exposition. They will inspect hundreds of exhibits at the spacious Michigan State Fair Grounds and participate in dozens of technical sessions sponsored by American Society for Metals, American Welding Society, Metals Branch of American Institute of Mining and Metallurgical Engineers and Society for Non-Destructive Testing.

There are indications that the Congress and Exposition will surpass all predecessors in interest and attendance. However, the feature that distinguishes next week's event from previous affairs is the first World Metallurgical Congress which will be held in conjunction with the regular Congress and Exposition. Several hundred metallurgists and metal production executives from 29 nations have been in the United States since mid-September. They have been inspecting American production and manufacturing techniques. Their visit to Detroit and their participation in the Congress will be the climax of their tour.

The associations formed by these visitors during their trip and in the Detroit assemblies have tremendous possibilities. Such exceptionally talented conferees from so many nations of the free world cannot be in almost daily contact for six weeks without discovering common bonds of interest, erasing nationalistic misunderstandings and forming useful foundations on which to build constructively in the future.

One trivial incident may be significant. On Sept. 29 many of the visitors from abroad were guests of William H. Eisenman, executive secretary of ASM, and Mrs. Eisenman at a delightful outing at their Sunnimoor Farm. Just before dinner was about to be served a Japanese conferee was observed in the act of teaching an attentive quartet, consisting of Turkish, Indian, Danish and Brazilian conferees, how to master the art of eating with Chinese chopsticks.

Is it too much to expect that nationals who find it so easy to exchange "know-how" of the order of eating with two sticks will also find ways to exchange "know-how" on improved techniques pertaining to metals? If the first World Metallurgical Congress helps to pave the way for this highly desirable accomplishment, it will be an unqualified success.

E. L. Shaner

EDITOR-IN-CHIEF

NO SELF-SUFFICIENCY: In his issue is a unique chart showing ratios of the self-sufficiency of the United States in relation to 19 minerals. Close examination of this chart should dispel any trace of complacency regarding our mineral resources, because it shows that we are dependent upon foreign sources for about half of the strategic and critical minerals we need.

The United States is self-sufficient in only

two of the 19 minerals—molybdenum and magnesium. It is 100 per cent dependent upon foreign sources for chromite and tin. In the remaining 15 minerals, the United States depends upon imports to the extent of the following percentages: Iron ore 8, zinc 29, copper 34, lead 45, tungsten 52, cadmium 53, arsenic 59, bauxite 63, antimony 79, graphite 80, cobalt 90, mercury 91, manganese 93, tantalum 99 and nickel 99.

These are disquieting percentages. Fortunately, comparisons show that mineral resources of free nations exceed those of communist nations by comfortable margins. Yet these margins do not warrant complacency. —pp. 120, 121

* * *

TWO-WAY EXCHANGE: Many of the metallurgists and metal production executives now visiting in the United States are deeply interested in research. This gives point to the current action of Battelle Memorial Institute, Columbus, O., in establishing Battelle International with headquarters at Zurich, Switzerland. It is expected a portion of Battelle's foreign research activity will be conducted in established laboratories in England, Holland, Germany and elsewhere.

This movement has attractive potentials. European scientists have done marvels in fundamental or basic research. In the United States the emphasis has been concentrated more heavily upon applied industrial research. Battelle plans call for research teams from the United States to study European activities and teams from Europe to examine the American method of operation. This two-way exchange should prove highly beneficial to progress in research on both continents. Basic and applied research need better co-ordination. —p 91

* * *

DIVIDING THE DOLLAR: When a major prime contractor lands a large defense order, how much of the dollar value of that order does he retain for his services? Case studies reveal interesting answers to this question. Of the "Air Force dollar" paid to Boeing Aircraft Co. on prime contracts for making B-47 jet bombers, C-97 Stratofreighters and B-50 piston engine bombers, 42.1 cents goes to subcontractors; 25 cents goes to the suppliers of materials, parts and services; and the remaining 32.9 cents is retained by Boeing for its own work. Figures from some other prime contractors show somewhat similar distributions of the contract dollar. The figures also show that from 50 to 90 per cent of subcontractors and suppliers are "small" businesses. —p. 92

* * *

PROGRESS IN THE RUHR: In 1950 steel ingot output in Western Europe was as follows: Great Britain 18.3 million tons, France and Saarland 11.7 million tons, the Ruhr 10 million tons, and the Benelux union 7.2 million tons. Probable production in 1951 will be 15.5 to 16.0 million tons for Great Britain, 11 to 12 million tons for France and the Saar, 12.2 million tons (the legal limit) or more for the Ruhr, and 10 million tons for Belgium and Luxemburg.

Comparisons show a definite decline in Great Britain and gains in France-Saar, the Ruhr and Benelux. But more important is the fact that gains in the Ruhr are enough greater than gains in France and the Saar to place the former ahead of the latter in total output in 1951. Also Benelux has gained impressively.

The phenomenal recovery of Western Germany, as evidenced by the performance of the Ruhr, intensifies French suspicions of allied postwar policy. Our Atlantic pact is confronted with delicate problems. —p. 97

* * *

LONG VIEW PROMISING: Market analysts of motordom are optimistic over the long-term trend in demand for automobiles. Because of this optimism, auto builders are more than willing to spend their money for new plants and equipment for defense, knowing full well that after the requirements for defense have been met, the facilities can be utilized for peacetime production of automobiles, trucks and busses.

This line of thinking is significant because the automotive industry already has demonstrated that it has a tremendous capacity. True, actual production in a calendar year has been slightly over 8 million units, but there have been occasions when assemblies topped 200,000 units weekly. This indicates a potential capacity of over 10 million units a year.

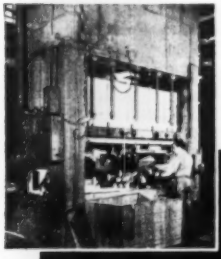
To turn out 200,000 units weekly with existing capacity involves overtime, shortcuts, expedients and too many headaches. Motordom thinks it needs more capacity to satisfy expected peacetime demand on a more orderly basis of operations. —p. 101

Firestone STEEL PRODUCTS SPEEDS DEFENSE SUB-CONTRACTS WITH NEW PRODUCTION LINES

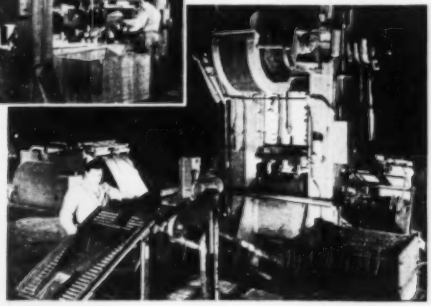
Automatic Machines and Integrated Production Turn Out Large-Size Stampings in Record Time

NEW automatic stamping machines are clicking out large-size stampings in record time at Firestone Steel Products, saving valuable time and money on defense sub-contracts. All production is integrated, from blanking through to painting or polishing.

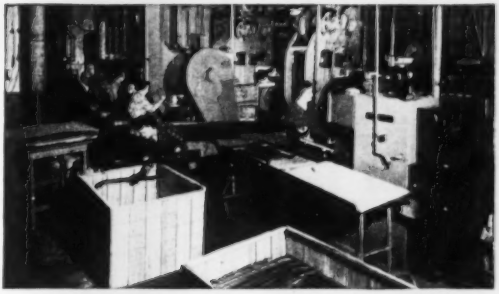
Firestone's two modernized metal fabricating plants at Akron, Ohio and Wyandotte, Michigan have been completely retooled for fast, low-cost production of those heavy, large-size stampings and assemblies so vital to the speedy delivery of aircraft and ordnance equipment and accessories. If your problem is large size stampings in a hurry, wire or phone Firestone Steel Products Company, Stampings Division, Akron 1, Ohio.



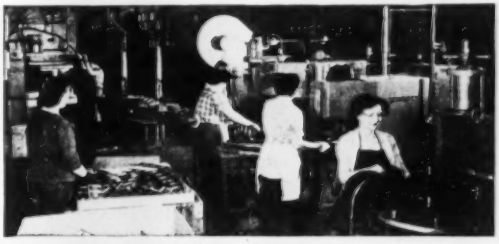
One of the huge multiple-die forming presses recently installed at Firestone for making jet engine components and parts for tanks.



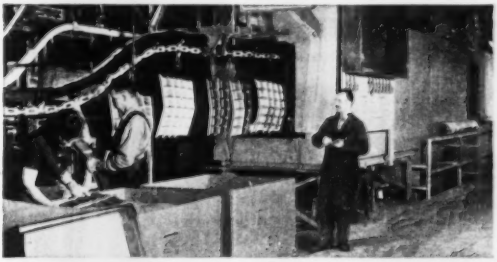
One of the new completely automatic synchronized presses producing 2600 large-size blanks per hour. Steel is fed from roll at extreme left.



Assembly operations are closely integrated with presses at Firestone, saving time and money. As many as four operations are handled at one time on new multiple-operating presses in left background.



Fast, efficient, straight-line methods save time and handling at Firestone. Parts move from presses on rollers or overhead conveyors to next operation.



Washing, bonderizing, painting, and baking are handled in a continuous automatic operation, moving entirely on conveyors from the stamping line.

Copyright, 1951, The Firestone Tire & Rubber Co.

Here's Timely Information For All Bearing Users

After testing bearings made of Glyco Babbitt in its own mills, a large, nationally-known company sent this statement to its many plants: "The actual results of our mills in using this babbitt have been very satisfactory. It appears to be a possible substitute for high tin babbitt for items prohibited by this (Gov't. Order M-8) order, but for which you normally use higher priced babbitt."

The results achieved by Glyco Babbitt for this great company are made possible by an exclusive manufacturing process that gives Glyco—a lead base alloy—physical properties equal to those of much more expensive and restricted high tin babbitts. Because of these superior physicals, and because Glyco Babbitt is an unusually homogeneous alloy, Glyco bearings are remarkably long wearing. Virtually free from dross when melted, Glyco pours freely and can be remelted again and again without loss in strength or quality.

Five types of Glyco are available for quick shipment from Ryerson. They cover all bearing applications—light or heavy shock loads, low or high shaft speeds. So get better bearings for less money with Glyco Babbitt from Ryerson. Write for information on the proper type for your particular application.

RYERTEX BEARINGS FROM RYERSON

Ryerson also makes a non-metallic bearing—Ryertex—for a wide variety of industrial applications. Possessing an extremely low coefficient of friction with only water lubrication, Ryertex also performs well with oil or grease for a lubricant. And Ryertex easily withstands strains up to 36,000 lbs. psi.; gives remarkably long service. Ask your Ryerson representative for full information.

PRINCIPAL PRODUCTS: CARBON • STAINLESS & ALLOY STEEL • BARS • STRUCTURALS • PLATES • SHEETS • TUBING, etc.

RYERSON-GLYCO

JOSEPH T. RYERSON & SON, INC.—STEEL SERVICE PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

Business Outlook: Mostly Good

Based on the bellwether gray iron foundry industry's experience, prospects are excellent for all except manufacturers with little or no defense work

BUSINESS WEATHER: Bright and promising over coming months in most areas; scattered showers for makers of consumer durables and for those manufacturers with little or no defense work.

You can get a look at the future climate for metalworking by studying what's happening in the barometric gray iron foundry industry now. That industry serves as a first-rate economic indicator because castings must be ordered by finished product makers months in advance, because castings are used in such a wide range of products and because the industry's defense work probably averages 30 or 40 per cent of its total volume, a proportion close to the average ratio in metalworking generally.

Still Good—Although some gray iron foundries have been paring their operating rates, the industry will produce a record 15 million tons of castings in 1951 (see chart). The peak performance is made possible by shipments of a sensational 8,106,000 tons in the first six months. That height won't be reached in this half, but shipments will still be excellent, nearly 7 million tons. The easing in this second six months is caused almost entirely by the diminishing demand from producers of automobiles, appliances and other consumer durables.

Gray iron foundries' experience with consumer durable demand indicates that other suppliers to manufacturers of those goods can expect sluggish going in that sector. But the drop in requirements should not be disastrous for the total business of stampers, nut and bolt makers and other manufacturers of components for civilian goods, judging from the way gray iron foundries are making out.

Their backlogs of orders still average between two and three months, compared with the highest backlog of three and a half recorded at the end of last February. Total industry sales this year may reach $4 billion, in contrast to about $3 billion in 1950. Heavy gray iron castings are in NPA's Group I classification for metals in very short supply. Order backlogs for castings over 3000 pounds are far more extended than the average two months. Light and intermediate weights of gray iron castings are in NPA's Group III—in fair to good supply. Good deliveries are possible on most light castings.

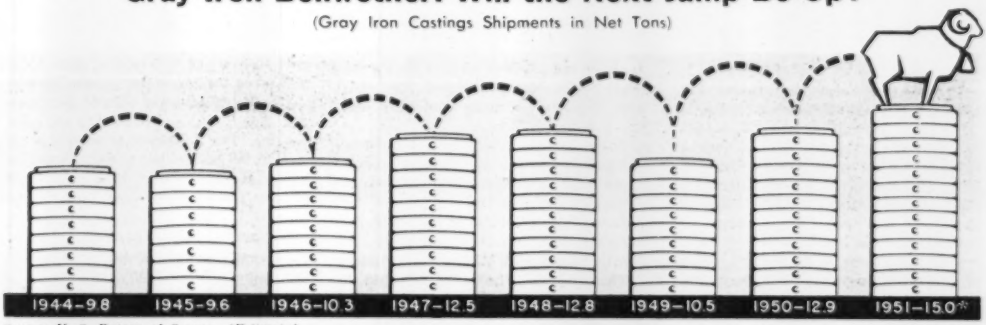
Looking Up—Partly because of the easing pressure in business, gray iron foundries are finding the raw materials situation slightly improved. Coke is in good supply, and stockpiling is going on now in preparation for winter. Cast scrap supplies are tight, but a shade better than a month ago. Steel scrap is as difficult to obtain as ever. Pig iron is also a problem. Scattered foundries across the country have been counting on imported iron to help them out, but the prices are getting out of reason. Austria has been offering foundry iron at $83 duty paid in cars, Philadelphia. Some shops have been getting Canadian iron at $73 to $75 a ton. A record 1 million tons of pig iron may be imported in 1951, but only about 10 per cent of it is of foundry grade. Alloys that are tough to get include nickel, copper and molybdenum. Ferrosilicon is getting tighter. Chromium is getting easier.

The major priority buyer of castings is the machine tool industry. General machinery and equipment industries and ordnance follow. Shops catering to machine tool builders find themselves in enviable shape now, since as much as 98 per cent of their business is for defense or defense-supporting programs.

Many of the farsighted gray iron foundrymen think the full extent of defense subcontracting has not yet been felt. They believe that when maximum-scale rearmament is at last a reality business will be better than ever.

Gray Iron Bellwether: Will the Next Jump Be Up?

(Gray Iron Castings Shipments in Net Tons)



Source: U. S. Bureau of Census. *Estimated

"Birthmarked" Steel Next?

Committee is named to study continuous marking of alloy steels for better identification

PROPOSALS to "birthmark" alloy steels at the producing mills, by such means as continuous ink stamping, in the interests of uniform, positive identification throughout distribution and processing channels, are being given serious consideration by interested groups.

Originating in the West Coast aircraft industry, largely through the efforts of E. H. Chandler, North American Aviation Inc., Los Angeles, the idea (STEEL, Dec. 25, 1950, p. 54) was batted around recently at a special meeting of the conservation

co-ordinating committee of the DPA in Washington.

Action — In attendance were 41 representatives of steel producers, aircraft and automotive industries, warehouses, technical and standards associations, Munitions Board and the iron and steel division of NPA. Upshot was appointment of a committee of six to report within three months on: What type of marking should be adopted; what classes of steels are to be marked; who is to do the marking; and where it is to be done.

The committee roster: Franklin P. Huddle, chairman, with the conservation division of the Munitions Board; C. E. Miller, U. S. Steel Corp., Pittsburgh, representing steel producers; W. J. Pannier Jr., Pannier Corp., Pittsburgh, representing the marking industry; F. W. Krebs, Super Steels Inc., Cleveland, representing warehouses; Capt. Floyd B. T. Myhre, secretary of the committee on marking of steel for the National Security Industrial Association; and R. E. Dawe, North American Aviation Inc., representing the aircraft industries.

Disagreement — There was by no means any unanimity of opinion on the question of alloy steel marking and it is recognized that the project may be a long-range one until present thinking changes. Everyone appeared to agree that mill marking would add to the cost of steel and this was a major objection on the part of some users, particularly the automotive industry, since it was assumed the added cost would have to be borne by the users. On the other hand, this would obviate the need for individual marking systems, would minimize the paper work involved in keeping track of different grades of steel, simplify the problem of scrap segregation, avoid troubles incident to unidentified surplus steel getting into wrong channels, etc.

Steel mills believe the total cost of marking would be less if done at some central location rather than at their mills in small lots. This, however, would necessitate a central depot devoted entirely to marking assembled tonnages and would greatly complicate the distribution pattern.

Support — Military agencies are strong for a system of continuous marking. They point to steel stocks built up in foreign countries during the war and returned to this country with no semblance of identification left and requiring either tedious chemical and physical testing, or scrapping.

Warehouse interests, except those handling primarily aircraft alloy steels, are inclined to go along with present marking (painting) or tagging systems. Automotive companies reported complaints over mixed steels have been negligible and are opposed to anything which would add to the cost of steel. The railroad industry supports some sort of continuous marking system, noting that about half its steel requirements are not marked and this causes confusion in materials handling for maintenance projects which consume about 80 per cent of all steel used.

Proponents of the continuous uniform marking system suggest a start with only cold-rolled and cold-drawn alloy steels, feeling that the problem is more critical with these materials than with the more common analyses in the hot-rolled varieties.

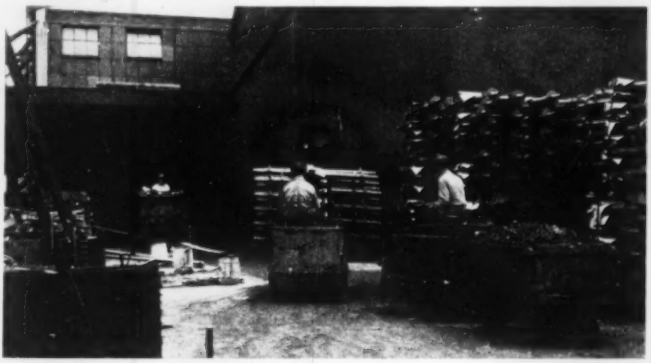
Identifying Steel by Certificate

The problem of alloy steel identification is getting increasing attention.

Capt. E. I. McQuiston, assistant to the vice president in charge of manufacturing, American Machine & Foundry Co., has a remedy, applicable to defense work, that does not involve extensive marking. He proposes:

"Certain responsible warehouses could be bonded by the government or the Armed Services. Under this bond arrangement, all steel in stock bins would carry the certification of the mill as to its chemical and physical properties. The warehouseman could then duplicate the certificate or certify to the purchaser with a rated order that the material meets the specifications, and, a big provision, that the technical bureaus and inspection services would accept this certificate or certification."

Captain McQuiston was for five years inspector of naval material for the New York area. He believes that all that's required in his plan is acceptance by the Armed Services of the fundamental principle and a directive from NPA to put it into effect.



THE PACE PICKS UP IN POWERED INDUSTRIAL TRUCKS
. . . it should be even faster in 1952

Lift in Truck Sales

Volume for the powered hand ling truck in 1951 promises to be double the 1950 level

THE HIGH cost and scarcity of labor are helping to push 1951 sales of powered industrial trucks to at least double the 1950 level. The volume is bound to show continued improvement in 1952.

The need for the materials handling equipment means sales may reach about $125 million in 1951, compared with about $50 million in 1950. The industry thus far has been able to keep up with the lift in sales, but the question now is meeting 1952 demand.

Three Ways—The industry hopes to meet the situation in three ways: By getting more materials through an increased proportion of defense orders, by standardizing more and by some plant expansion.

Industrial truck makers today are devoting about 65 per cent of their production to defense or defense-related programs. At the beginning of the year, only about 15 per cent of output went to defense. If that ratio goes even higher—and it probably will the manufacturers believe they will get a better deal on materials allocations. The industry is intensifying its efforts to standardize its products to boost output, but there's a limit to how far it can go. As long as old plants or facilities poorly designed from a materials handling point of view remain in existence, the need for tailor-made trucks will remain.

Industry Anatomy — Nearly 30 companies in the U. S. make gaso-

line and or electric industrial trucks and tractors. About 16 account for most of the production. Some 2.4 gasoline-powered units are made for every electric truck, but the electric-powered units are usually designed with bigger capacities. The major buyer today is probably the auto industry, both for its defense and civilian business. The largest purchasers with priorities seem to be aircraft and companies beginning aircraft parts manufacture.

There are five types of powered industrial trucks: The low lift platform, the high lift platform, the fork unit, the load carrier (hand pushed but with power attachments) and the tractor and crane trucks. Biggest seller is the fork truck; tractor and crane trucks account for only about 2 per cent of total volume. Some manufacturers are trying to avoid a World War II pitfall when, because of the pressure of events, too many of the wrong kind of units were sold. Fork trucks, especially, were oversold.

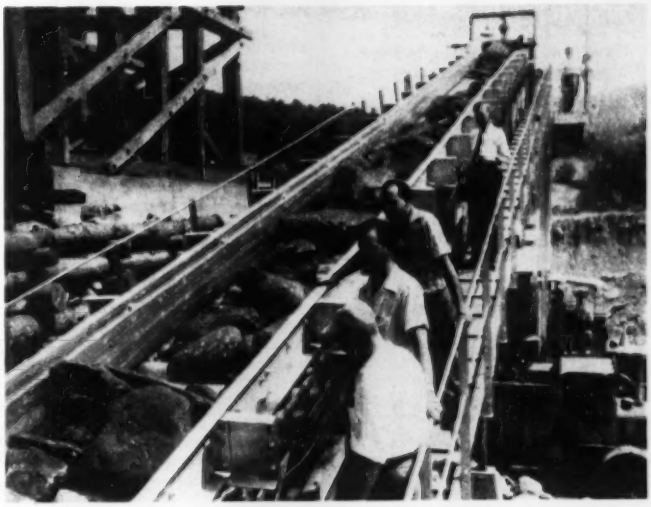
Fanning Effect—The dollar sales effect on the economy of industrial truck production is far greater than just the $125 million volume would indicate. That's because truck accessories—pallets, skids, trailers, battery charging equipment and other ancillary equipment will account for six to eight times as much in 1951 metalworking sales as the actual truck shipments. In 1950 when about $50 million worth of trucks were built, an estimated $350 million additional was realized in sales of ancillary equipment to accommodate the loads handled by trucks.

Copperweld Buys Flexo

Purchase of Flexo Wire Co. Inc., Oswego, N. Y., was made by Copperweld Steel Co., Glassport, Pa., which will operate Flexo as a wholly owned subsidiary.

Flexo has been a producer of small and fine sizes of Copperweld, copper and bronze wires and cables with a capacity of more than 500,000 pounds a month. Copperweld will utilize Flexo's production facilities for immediate production of small and fine sizes of copper-saving Copperweld wires and cables for the electronics and electrical appliance industries. Flexo also will continue to produce certain sizes and types of copper and bronze wires and cables.

Copperweld's action in acquiring Flexo's business, says Copperweld's president, Frank R. S. Kaplan, is indicative of growing interest in Copperweld wire as a copper-saving alternate for copper in pigtail leads for condensers and resistors, hook-up wire and power cords for radio and television sets.



WATER IS THE IMPORTANT THING: Engineers study operation of metal pan conveyor which carries off stones screened from the gravel used for Downville, N.Y., dam. The Hewitt-Robins conveyor, 48 inches wide and 110 feet long, handles rocks as heavy as three tons. Scheduled for completion in 1954, the project will dam the East Branch of the Delaware river as a step in rebuilding the Pepacton Reservoir, which will result in 300 million more gallons of water daily for New York City

Bridgeport Brass Enters Aluminum Field

The company will buy ingots from large aluminum producers for melting down and conversion. The move was dictated by the shortage of copper and zinc

SHORTAGE of copper and zinc is forcing brass and copper mills further into the aluminum fabricating field.

Latest move is by Bridgeport Brass Co., Bridgeport, Conn., which is going to start converting aluminum ingots into finished products. The company will buy ingots from the large aluminum producers for melting down and conversion into aluminum alloys in various semifinished forms. Semifinished would be processed further into products such as sheet, rod and wire.

A Natural—Bridgeport, large independent brass and copper mill, is dependent on the producers of copper. Because of the copper and zinc shortage, fabricators dependent on others for a copper supply have been turning to alternate materials. Fabrication of aluminum is quite similar to that of copper and brass products and fits in well with copper and brass mill equipment and operations for the most part.

Bridgeport Brass says the supplementing of its brass and copper mill production with aluminum will not mean any broad program of plant and equipment expansion now.

The Trend—Some of the copper and brass mills have been in the aluminum business in varying degrees for some time. Bridgeport Brass has acted as a sales agent for aluminum sheet; another independent, Scovill Mfg. Co., Waterbury, Conn., has been cold-rolling aluminum sheet into various gages; and a third independent, Revere Copper & Brass Inc., New York, has been melting aluminum ingot and converting it into finished products.

In announcing its new venture, Bridgeport Brass says: "With the present huge demand for copper and zinc for defense purposes, the long range outlook for added sources of supply of these semi-precious metals is such that it is wise for the company to supplement its present field of operations." This action is akin to that which Defense Production Administrator Manly Fleischmann suggested last week. He said the outlook for a copper supply is such that users of copper should consider switching to some other material.

Administrator-Engineer

Dual role is increasingly important, Inland official tells iron, steel engineers

ENGINEERS must learn to administer as well as engineer.

Increasingly, administration is becoming a legitimate engineering function, says Inland Steel Co. Vice President Hjalmar W. Johnson, because "our processes are becoming more and more complicated and the job

I. N. TULL
. . . '52 president, AISE

of co-ordinating all the specific technical processes and skills more and more important." He spoke last week before the annual convention of the Association of Iron & Steel Engineers in Chicago.

Or Else—Engineers who shirk the respons.bility of administration, Mr. Johnson believes, will see their professional stature erode away as the job is taken over by others skilled in administration. He says engineers with intimate knowledge of the essentials of construction and operation can make tremendous contributions to the organization of men and processes and the selection and training of personnel.

During the business session I. N. Tull was elected president of the association for the calendar year 1952. He is electrical superintendent of the Cleveland district of Republic Steel Corp. and also chairman of that company's electrical committee. John L. Young, vice president-chief engineer of United States Steel Co., was elected first vice president. Second vice president will be E. L. Anderson, electrical superintendent of Bethlehem Steel Co. at Johnstown, Pa. John H. Vohr has been elected treasurer. He is the general superintendent of the Gary Steel Works of United States Steel Co. W. H. Collison, superintendent of the coke plant, Great Lakes Steel Corp., becomes secretary.

Winners—The board of directors announced the winning AISE Kelly Award Papers for 1950. First prize went to E. T. Lorig, U. S. Steel, for his paper on "Automatic Self-Centering Rolls and Pulleys." Carl G. Hogberg, United States Steel Corp. of Delaware won second prize with his paper entitled "Technical Aspects of Northern and Southern Blast Furnace Practice." Another blast furnace paper took third prize which was awarded posthumously to Frank Janecek, former blast furnace engineer of Republic Steel Corp. for his paper, "Five Years of Blast Furnace Operation Under Elevated Top Pressure."

Among runners-up in the competition was Ross E. Beynon of U. S. Steel Co. for his paper, "Pass Design of Angular Sections." Mr. Beynon has been runner-up or has won one of the Kelly awards ever since they were established in 1943 to honor John F. Kelly, managing director of AISE from 1917 to 1934. Other runners-up included C. W. Barrett of Republic Steel Corp. and Andrew F. Kritscher of National Tube Co. The Kelly award carries prizes of $300, $200 and $100 for first, second and third places, respectively.

Joy To Build Coal Machine

Joy Mfg. Co., Pittsburgh, has made an agreement with Bituminous Coal Research Inc. covering exclusive rights to certain features of a flexible steel shaker conveyor on which Joy previously had applied for basic patents.

Joy will now build commercial models of the new shaker conveyor, embodying the best features of both BCR and Joy designs. The conveyor is equipped with an extensible stainless steel belt. One end of the belt unwinds off a spool to follow the continuous mining machine as it digs its way into the coal face. When not in use, it is rewound and stored in a spool or drum. The belt is long enough to permit the mining machine to advance 300 feet or more without interrupting the flow of coal to the outbound haulage system.

September Employment Drops

Employment turned downward as usual between August and September, as student workers left their summer jobs to return to the classroom.

Estimated at 61,580,000 in the week ended Sept. 8, total civilian employment was about 1 million under the August level, according to the latest Census Bureau figures. Nonagricultural employment fell to 54,054,000 in September from 54,942,000 in August; teen-age youngsters accounted

SANE AND SOBER: What is said to be the only crane runway with a reverse curve belongs to Lehigh Structural Steel Co., Allentown, Pa. Extension of the crane runway was needed to enable the company to make maximum use of its yards north of the bridge. Yet a straight-line extension would have been halted by the pier of the highway bridge which spans the Lehigh river. Two sets of wheels of different diameters on the end of each axle on each end truck, specially built crane cabs, and the reverse curve did the trick

for virtually all the change. Unemployment, estimated at 1,606,000 in September, remained almost unchanged from the previous month. Agricultural employment, estimated at 7,526,000 in September, showed little change from August.

Caterpillar Back to Work

A two-month strike at Caterpillar Tractor Co., Peoria, Ill., has ended and the plant is again producing at full capacity. Company and Union (CIO-UAW Local 974) agreed to an across-the-board increase of 13½ cents per hour for employees in the bargaining unit and a cost-of-living wage adjustment next February. The agreement is being submitted to the Wage Stabilization Board. This longest strike in Caterpillar history caused an estimated loss of $75 million in sales and $18 million in wages and local purchases. More than 22,000 production employees were idle during the strike.

Research Plan Set in Europe

Battelle Memorial Institute, Columbus, O., is now setting up Battelle International, with headquarters probably to be at Zurich, Switzerland. Dr. Clyde Williams, director, will go to Europe later this month to join John Crout, Dr. B. D. Thomas and W. R. Keagy, his assistants, who have been in Europe for some weeks working on final arrangements.

Ultimately it is expected that Battelle International will maintain laboratories and offices in several European countries. It is also anticipated that a portion of its research activity will be conducted in existing laboratories such as the Fulmer Research Institute in England, the TNO Council in Holland and the Max Planck Gesellschaft in Germany. Financial support for research programs will come from industrial sponsorships, both American and European, and from Battelle's endowment.

As pointed out by Battelle's R. R. Adams, European science has developed to its highest degree in the field of fundamental or basic research, while American science has been more concerned with applied industrial research. It is expected that an amalgamation of these two techniques will result in a significantly higher level of research benefits to all concerned.

Plans also call for the dispatch of teams of scientists from the Columbus laboratories to these international centers to work with European researchers for limited periods of time. In the same way, groups from European laboratories will travel to this country to study industrial research techniques.

Tool Distributors Meet

AMTDA members hear Tigges, Bergstrom, Berna at 27th annual meeting

THE COMBINATION salesmen-engineer-diplomats of the American Machine Tool Distributors Association heard chorused pleas for more—and more productive—machine tools at their 27th annual meeting in Atlantic City last week.

At a heavily attended meeting (260 members and guests representing about 100 of the 166 member companies were present) they heard such speakers as Lt. Gen. Orval R. Cook, deputy chief of staff, Materiel, U.S. Air Force; Herbert L. Tigges; Swan E. Bergstrom, who will succeed Mr. Tigges as director of NPA's Metalworking Equipment Division; and Tell Berna, general manager of the National Machine Tool Builders Association.

Never Before—AMTDA members, whose production and tool engineering know-how is used in adapting old and new machines to new and unfamiliar uses in production of weapons, ammunition and aircraft, heard about some of the latest techniques. General Cook told them about the machining of ribbed wing sections from solid aluminum alloy plates and aircraft instrument work that surpassed in accuracy and complexity any watch making or instrument making encountered before.

A. R. Eckberg, manager, Engineering and Maintenance, of Eastman Kodak's Kodak Park Works emphasized how existing machines could be adapted to unusual uses. His outstanding example was that of converting old lathes to the milling of apertures in range-finder tubes.

Afterward, What? — Tell Berna predicted marked improvement in machine tool deliveries in the months ahead. Looking even farther ahead, he pointed to the possibility of foreign machine tools being imported into this country in large numbers having a serious effect on future foreign markets. While admitting that "what is best for the people of the United States is the thing we must work and fight for," he thought the foreign tools would involve serious service and repair problems. AMTDA members who attended the Paris machine tool show not long ago agreed. Some said obviously impossible delivery dates were being quoted.

The distributors were also looking way ahead. One session was on the selection and training of machine tool salesmen. And Frank Bettger, author of the recent "failure to success" best seller, told of the importance of enthusiasm in selling.

New Officers—AMTDA's new officers are:

President, E. J. Seifreat, president of Seifreat-Elstad Machinery Co., Dayton, O.

First Vice President, John M. Riordan, president of Riordan Machinery Co., Detroit.

Second Vice President, Edwin R. Motch, Jr., president of Motch & Merryweather Machinery Co., Cleveland.

Secretary-Treasurer, George B. Mc-Clennen, a partner in Delta Equipment Co., Philadelphia.

E. J. SEIFREAT
. . . AMTDA '51-'52 president

New members of the executive committee are: Manus F. Campbell, president of Peninsula Machinery Co., Detroit; J. D. Germain, general manager of Eccles-Germain Machinery Co., Los Angeles; L. M. Wiertz, general manager of F. F. Barber Machinery Co., Toronto; and J. F. Owens Jr., partner and general manager, J. F. Owens Machinery Co., Syracuse, N. Y.

RFC Gives up Foote Bros. Stock

Reconstruction Finance Corp. is no longer largest single owner of common stock in Foote Bros. Gear and Machine Corp., Chicago. The company bought up 28,927 shares held by RFC since 1936, and will ask stockholders to approve retirement of those shares in order to put through a three-for-two split of common stock. RFC never took part in management of Foote Bros. It realized, through retirement of 21,913 shares of preferred stock and from dividends, a sum sufficient to liquidate the original loan at a substantial profit.

Fired Up on Safety?

An industry that can't increase your production may do much to lower costs of down-time if a fire breaks out in your plant. It's the 10-company fire extinguisher industry (making hand and wheeled type portable first aid fire extinguishers), which is having its materials problems, as is everyone else. With some it is getting steel, with others copper, brass, lead and tin. And materials alternates are as rough a problem with them as it is with capital equipment makers. Says Walter Kidde & Co., because of the peculiar nature of fire extinguishers they must stand up against corrosion over many years and with relatively little care. Too, most units must be able to withstand terrific pressures.

Thought about civil defense program has had little effect on the industry but has helped the sales of some other types like built-in systems for industry. There is little doubt that the industry's volume, which was in the doldrums two years ago, will be increased by the mobilization effort. But many manufacturers of the equipment think if a civilian defense program is developed, it won't affect their industry too much; they believe a renewable pump type extinguisher will again be manufactured.

One thing fire extinguisher manufacturers can look to for greater volume is the publicity being given this week by the National Board of Fire Underwriters to the cause of safety: Oct. 7 through 13 is National Fire Prevention Week.

Defense Department Tallies Up

Totaling up its obligations for the first two months of the Fiscal Year 1952 (July and August, 1951), the Department of Defense reports $6.9 billion spent for procurement of major equipment, supplies, military construction and expansion of production facilities. Obligations include firm contracts, financed portions of accepted letters of intent and project orders with shipyards and arsenals.

Procurement of "hard goods" (aircraft, ships, tanks, weapons, ammunition, production equipment, electronics and other equipment) amounted to $6.1 billion, and "soft goods" procurement (clothing, subsistence and petroleum) totaled $0.5 billion and construction $0.3 billion.

For the 14 month period following the attack on Korea, the Department of Defense has obligated a total of $42.1 billion for procurement and construction: $35.6 billion for "hard goods", $4.5 billion for "soft goods" and $2.0 billion for construction.

BIG RESPONSE: A large attendance record was set by the Military Business Opportunity Display held in Los Angeles, Sept. 18-21 when 10,895 businessmen seeking subcontracts were attracted to the displays. Eighty-two prime contractors exhibited items to be farmed out

Subcontractors' Teamwork Makes Defense Jobs Click

MAKE no mistake—the small defense jobs are vital to the success of the defense program. Extra effort in finding and easing the way for subcontractors in the past few months indicates that the Armed Forces and most prime contractors appreciate and need the contributions of small business.

Case Study—The aircraft industry is a good example of the teamwork being used on defense contracts. Of the more than 60,000 subcontractors and suppliers of prime Air Force aircraft producers, 52,200 or 87 per cent are small business firms. Of the four largest prime aircraft contractors, Lockheed Aircraft Corp. will distribute $3 million, or 127 per cent more than 1950, to subcontractors and suppliers; Douglas Aircraft Co. will pay out 46.7 per cent of its sales dollars to subcontractors and suppliers this year, and 3650 of its 4000 subcontractors and vendors will be small businesses; the aircraft division of Pratt & Whitney will spend $2.5 million among 5285 subcontractors and suppliers for 30,000 parts, and 90 per cent of these companies are small business firms; and finally, Boeing Airplane Co. is currently subcontracting 42.1 per cent of the dollar value of its prime contracts for making the B-47 jet bomber, the C-97 Stratofreighter, the B-50 piston-engine bomber, and in addition 25 per cent goes for parts or raw materials.

Good Share—General Electric Co. has a first team of 17,000 subcontractors and suppliers to which GE will pay more than 50 per cent of the $5.5 million in defense contracts it now holds. Many of these 17,000 companies in turn deal with thousands of other small businesses. More than 4000 suppliers contribute to GE's production program of the J-47 jet engine, and last year took 60 per cent of the program's dollar volume.

Another major subcontract in other than the aircraft field was announced when Consolidated Western Steel Corp., subsidiary of U. S. Steel Corp., received a $13-$15 million subcontract to produce hulls for personnel carriers for the Army. The finished hulls will be shipped to Food Machinery & Chemical Corp., San Jose, Calif., the prime contractor, for final assembly.

Other contracts awarded by the government, in excess of $250,000, follow:

Product	Contractor
Concrete Spreaders	Blaw-Knox Co., Pittsburgh
Road Graders	Rome Grader Corp., Rome, N. Y.
Crushing Plants	Iowa Mfg. Co., Cedar Rapids, Iowa
	Pioneering Works Inc., Minneapolis
Post Office Trucks	Fargo Motors Corp., Chrysler Corp., Detroit
Gun Carriages	Baldwin-Lima-Hamilton Corp., Eddystone, Pa.
Refrigerators	Franklin Transformer Mfg. Co., Minneapolis
Antenna Masts	Modercraft Co. Inc., Brooklyn, N. Y.
Periscope Mounts and Related Equipment	Gilbert & Barker, West Springfield, Mass.
Radio Receivers, Test Set Kits	Philco Corp., Philadelphia
Rawin Sets	General Electric Co., Schenectady, N. Y.
Crystal Units	Pacific Electronics, Saticoy, Calif.
Flashlights	Bright Star Battery Co., Clifton, N. J.
Projectiles, 20 MM	Pantex Mfg. Corp., Pawtucket, R. I.
Brass Cartridge Cases	Norris Thermador Corp., Los Angeles
Metal Parts for Mortar Fin, 81 MM	Precision Castings Co. Inc., Syracuse, N. Y.
Spare Parts for Fire Control Equipment	Arma Corp., Brooklyn, N. Y.
Washers, Shackles, Clips	Graybar Electric Co. Inc., New York

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Controlled Materials Plan

IMPORTED STEEL—Amendment of Sept. 28, 1951, of Direction 4 to CMP Reg. 1 permits a steel consumer to use imported steel to manufacture more products than the quantity shown on his authorized production schedule, whether or not the user or the person from whom he purchases the steel obtains title before the steel reaches the U. S. Prior to this action, this authority was granted only in the case of imported steel, the title to which was taken by the consumer before the steel reached the U. S. Under this amendment, effective Sept. 28, a person who uses imported steel purchased from the broker or importer who takes title to it before it arrives in the U. S. need not deduct the tonnage from his allotment of controlled materials.

UNDELIVERED MATERIALS—NPA action on Oct. 1, 1951, requires a customer to charge to his fourth-quarter CMP allotment any unfilled order calling for third-quarter delivery but which was not shipped by Oct. 7. This action was accomplished by amending CMP Reg. 1, and issuing Direction 7 to CMP Reg. 1, Direction 3 to CMP Reg. 6, and Direction 3 to NPA Order M-5. Previously, an authorized controlled material order accepted by a mill for delivery during the third quarter might be filled at any subsequent time and still be charged against a third-quarter allotment.

LOTS OF TIME—PIECES: Stamping the serial number on a part of the 50 millionth precision watch to be made by Elgin National Watch Co., Elgin, Ill., the young lady helps Elgin reach a goal hailed as a first in the world's horological industry. Included in the first jeweled time-piece to bear a serial number in the 50-million bracket are Elgin's new non-corrosive alloy escape wheels

Materials Orders

CONSUMER DURABLES—NPA Order M-47B, effective Oct. 1, 1951, permits flexibility in the use of steel, copper and aluminum for output of consumer durable goods. M-47B, which succeeds M-47A, allows a manufacturer of products listed in the order to shift his production for any calendar quarter from one product to another in the same group.

FERROALLOYS—The NPA on Oct. 1, 1951, revoked seven orders controlling distribution and uses of critically short ferroalloying materials. These revoked orders have been superseded either by NPA Orders M-80 or M-81. The nullified orders are M-3 (columbium and tantalum-bearing steels); M-10 (cobalt); M-14 (nickel); M-30 (tungsten); M-33 (molybdenum); M-49 (columbium and tantalum); and M-52 (molybdenum-bearing steels).

COPPER—The NPA on Oct. 1, 1951, revoked its order M-12 and Directions 1 and 2 to that order which limited the use of copper and copper-base alloys. Controls on these are now embodied in orders M-47B (use of steel, copper and aluminum), M-4 (construction), M-74 (building materials), CMP Reg. 5 (MRO), and CMP Reg. 2 (inventory restrictions).

FARM EQUIPMENT—The NPA on Oct. 1, 1951, revoked its order M-55A and Direction 1 thereto. They provided interim relief to farm equipment makers, who now are covered by CMP.

COMPONENTS—The NPA on Oct. 1, 1951, revoked its order M-60 and Direction 1 thereto. They provided interim relief to components makers, who now are covered by CMP.

MACHINE TOOLS—The NPA on Oct. 1, 1951, revoked its order M-61 and Direction 1 thereto. They provided interim relief to machine tool producers, who now are covered by CMP.

MARINE MRO—Amendment of Oct. 1, 1951, of NPA Order M-70 extends into the fourth quarter the priority assistance NPA has given for procurement of marine maintenance, repair and operating supplies and minor capital additions by ship operators, marine suppliers and ship repair yards.

Price Regulations

IMPORTS—Ceiling Price Regulation 31 governing imports is republished to incorporate the text of Amendments 1 through 9.

NEW MANUFACTURERS — Amendment 16 of Ceiling Price Regulation 30 permits new manufacturers who cannot determine ceiling prices under the machinery ceiling price regulation (CPR 30) because they were not in business before Jan. 1, 1950, to apply to the Office of Price Stabilization for approval of proposed ceilings.

CONVERSION STEEL—Amendment 28 of Ceiling Price Regulation 22 and Amendment 15 of CPR 30 permits manufacturers to raise their ceiling prices to reflect increased costs of using more conversion steel than they did before the Korean war. The amendments were effective Oct. 2, 1951.

COKE, CHEMICALS, GAS—Amendment 4 of Supplementary Regulation 13 of the General Ceiling Price Regulation extends to midnight Dec. 31, 1951, the expiration date of SR 13 which permits producers of all grades of coke, coal chemicals and coke oven gas to adjust their ceiling prices to reflect increased delivered costs of raw materials.

CASTINGS—Amendment 2 of Ceiling Price Regulation 60 extends the effective date of the Office of Price Stabilization's ceiling price regulation on metal castings from Oct. 1 to Oct. 26, 1951.

ALUMINUM SCRAP—Amendment 1 of Ceiling Price Regulation 54 modifies the Office of Price Stabilization's aluminum scrap ceiling price regulation with respect to sales of wrecked aircraft by the U. S. government.

LEAD, ZINC—Supplementary Regulation 70 to the General Ceiling Price Regulation adjusts ceiling prices for slab zinc and primary lead produced in the United States, its territories or possessions. SR 70 was effective Oct. 2, 1951.

LEAD, ZINC—Supplementary Regulation 71 to the General Ceiling Price Regulation establishes the ceiling price for foreign slab zinc and foreign primary lead at the level of the adjusted ceiling prices for similar domestic products. SR 71 was effective Oct. 2, 1951.

TRAFFIC JAMS ARE HELPFUL: A 15-jeweled auto watch, which is wound by the motions of the car, is appearing on two of Oldsmobile's 1951 models and being marketed as a novelty item in New York. Its inventor, Zvonko M. Maar, of Zurich, Switzerland, holds the winding mechanism in his left hand. The winding mechanism fitted together is in the left foreground

Windows of Washington

Need money to finance a defense project? One source may be a government V-loan. U. S. has already passed out more than $1 billion on 650-700 applications

GAINING STATURE after a year of operation, the government V-loan program promises to approach the size of its World War II predecessor. It has already passed the $1 billion mark in loans approved on some 650-700 applications by industries engaged in defense work.

Between 1942 and 1945, its counterpart allocated $10 billion on 9000 authorizations (and earned $25 million profit for the guaranteeing agencies — Army, Navy, Maritime Commission). With arms orders going out at a rate of nearly $1 billion a week, the V-loan program—one tool for financing defense contracts—is bound to grow fast. Activity hasn't reached down to subcontractors in heavy volume yet, and they're the ones who really need the money.

Branching Out — Nine government agencies are now qualified to certify companies for V-loans. They are: Defense (Army, Navy, Air Force), Interior, Commerce and Agriculture Departments; Atomic Energy Commission; General Services Administration and Defense Materials Procurement Agency.

Procedure in getting a V-loan is simple. The applicant company needing funds to produce on a government contract goes to any private financing institution (local bank, insurance company, etc.), which handles financial aspects of the transaction with the Federal Reserve Board. FRB takes it to the appropriate government agency for certification that the materials furnished or services performed under contract are essential to national defense. The guarantor authorizes the loan and FRB, as fiscal agent, executes it, collecting the guaranty fee and accounting to the agency for it.

Finances—Highest interest rate allowable is 5 per cent. On top of this, the private bank can charge a commitment fee of 0.5 per cent.

Most government agencies are interested primarily in supplying working capital, but General Services Administration will now consider applications for facilities expansion loans. GSA says it will consider a loan for expansion by a machine tool builder even though he has no government contracts, prime or sub. Even a subcontractor or supplier to a tool builder could qualify under this policy. National Production Authority acts as consultant to GSA if an applicant has no contracts with the latter.

CMP Under Fire

CMP is hurting small business. That was the gist of a report on CMP hearings by the House Small Business Committee. The major change recommended in its operation by the report was the shifting of NPA—the proprietor of the program—from the Department of Commerce to integrate it within the Defense Production Administration. DPA was criticised for cutting structural steel allocations to the steel expansion program. A broadside was directed also at NPA compliance regulations for their unnecessarily complex language. Early abandonment of CMP was called for as "controls on materials severely restrict the ability of small business to expand and of new businesses to find a foothold in the economy."

New Wage Policy . . .

Latest policy of Wage Stabilization Board is to allow lowest-paying firms in a certain industry or area to petition the board for approval to bring wages up to comparable levels of its competitors or neighbors. The inter-plant inequity policy, as it's called by WSB, is involved in more than 1000 cases in the WSB backlog awaiting policy formulation.

St. Lawrence Seaway Again . . .

After two months of relative quiet, the St. Lawrence Seaway and Power Project is again being mulled and mauled by Congress. Latest resolution—by Rep. John A. Blatnik, (Dem., Minn.)— calls for prior agreement with Canada on tolls to be charged, means of exchanging information on annual overhead costs, authorization of the President to negotiate with Canada on setting toll rates, a bipartisan commission to supervise construction, authorizing the Army Engineers to build the U. S. portion, and setting up of a St. Lawrence Fund in the Treasury to facilitate an accurate accounting of costs and performance results. Canada is planning to go ahead with building an All-Canadian channel if the U. S. doesn't approve a joint venture.

Arrivals and Departures . . .

Walter C. Skuce, NPA Assistant Administrator for Production Controls, and chief contributor to organization and development of the Controlled Materials Plan, returned to his position with Owens-Corning Fiberglas Corp., Toledo, O. William C. Truppner, Deputy Assistant Administrator for Production Controls since last April, has been appointed acting administrator.

Ernest W. Heilmann, has been designated acting director of the Consumer Durable Goods Division of Office of Price Stabilization.

Robert E. Williams, on leave from Automatic Electric Co., Chicago, is new Director of Communications Equipment Division of NPA.

Machinery Catalog Ready . . .

A 1951 revision of the monumental *Directory of Metalworking Machinery* has been published by the Munitions Board and copies are obtainable at $3.50 from the Superintendent of Documents, Washington 25, D. C.

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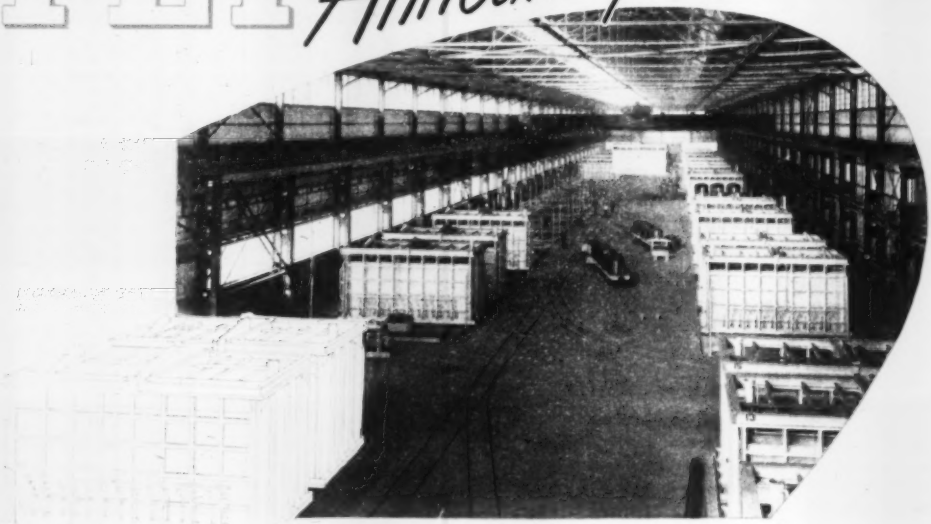

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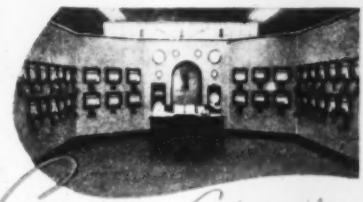

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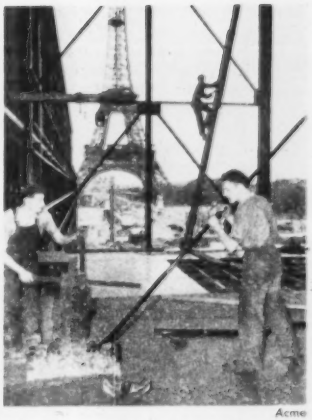
WHAT'S NEW IN FRANCE: Modern French automobile design is shown in the Simca 9 Aronde. A four-cylinder car, the Aronde can go 75 miles an hour and can make 30 miles on a gallon of gasoline. Its small valve-in-head engine develops 45 hp at 4000 ← revolutions per minute

PORTABLE BUILDING: Two French workmen twist tubing to be used in erecting the United Nations Building in Paris, France. The seven-story building, situated near the Eiffel Tower, puts the accent on modern architecture—being entirely dismountable. United Nations General Assembly sessions will be held there in November of this year →



Acme

Schuman Plan—Is It Dying?

Enthusiasm for the proposal to pool Europe's coal and steel resources has ebbed, but it still has a chance of acceptance. The French parliament may vote on it soon

WHAT happened to that Schuman plan to pool European steel and coal resources that caused so much furor when it was introduced nearly 18 months ago?

The proposal is still hanging fire, but the Korean war and the Atlantic pact have stolen the headlines, controversial aspects of the plan have brought second thoughts on the matter and enthusiasm generally has ebbed. The French particularly are uneasy about the resurgence of West German industry and fear that the Germans will exercise undue control over the pool.

Up to a Vote—The French parliament may vote on the issue this month, but the results are uncertain. Approval by all participants' legislatures are required, and ironically the greatest troubles are expected in the parliament of the nation which originally introduced the proposal. Even in May, 1950, when France was not so concerned about German industrial power, a test vote on the issue in the Foreign Affairs Committee of the French National Assembly approved the government's stand by only 18 to 17.

West Germany's steel production this year promises to match or exceed that of France and the Saar combined. Ever since last April, German steel production has taken the lead over the Franco-Saarland combine, and therein lies the reasons for the Gallic alarm. Ruhr output is now ranging from 1 to 1.2 million net tons a month, compared with a production of slightly less than that in France and the Saar. The Ruhr turned out about 10 million tons in 1950; Franco-Saarland 11.7 million tons. The new German republic is now only nominally limited by the Allies to the legal steel production limit of 12.2 million tons a year.

Ruhr Recovery Is Phenomenal

The recovery in West Germany has been phenomenal. Industrial production is now 30 per cent better than it was in 1936. Exports are moving at the annual rate of $2.7 billion a year, compared with $1.4 billion in 1936 for the same geographical area. Employment in 1936 was about 10 million; it's more than 14 million now. Industrial productivity is slightly—but only 4 per cent—below the 1936 level.

But grave problems exist for the republic. Inflation is not checked and a 10 to 15 per cent price increase on high-quality steels had to be granted in September. Coal production is improving slightly, but it's still inadequate.

Labor is still restive and the whole economy has not yet recovered from a four-week strike in Hessen by 100,000 metalworking men who finally returned to work only after a hefty wage hike.

Reorganization of West German steel and coal companies, as decreed by the Allies, is another headache. Of the 28 new "unified" steel companies set up by Allied order, only 13 have thus far been organized. What's more, the Social Democratic party, led by Kurt Schumacher who is considered a demagogue by some Allies, has just introduced a new plan in the parliament to nationalize the coal and steel industries. The party proposes to compensate the owners by means of bonds which pay interest of 2 or 3 per cent. The plan is similar to one backed by unions.

Escalator Index in France

France is moving toward a sliding wage scale tied to the cost-of-living index that would be similar to the General Motors plan in the U. S.

That expedient is being considered because inflation has not been stopped in the country. Minimum wages and salaries will also be raised, to 28 cents an hour or $57 a month, a 14.9 per cent increase. That will put wages up about 25 per cent from year-ago levels. The increases will scarcely cover cost-of-living boosts. Just in the last month, coal has been increased 20 per cent, electricity 10 per cent and steel 15 to 18 per cent.

French balance of payments with foreign countries will probably be more out-of-joint in 1951 than it was in 1950.

That's partly because of increased coal imports. So great is the need for coal that the nation has been importing at the rate of about 1.2 million net tons a month, compared with average monthly foreign purchases of 825,000 tons in 1950. Major suppliers are West Germany, the U. S., Benelux, Great Britain and Poland, in that order.

Shortages Hamper U.K. Output

Raw materials shortages are putting the damper on British steel production, which is now running at the annual rate of about 15.5 million net

tons, compared with 18.3 million tons in 1950.

The boost in steel prices has caused scarcely a ripple. British quotations are still among the lowest in the world, comfortably below the U. S. levels.

The recent boost in iron and steel scrap prices has been beneficial, for more of the material has come out of hiding. Nevertheless, scrap is still one of the most difficult items for the steelmaker to get. Coal is also dangerously short, not because of lower productivity but because of the scarcity of labor. British coal stocks at the beginning of winter should stand at about 20 million net tons; now they're only about15.7 million tons.

Autobuilders can't get nearly enough steel, and that factor may dull some of the glitter originally expected for the 36th International Motor show to be held in London, Oct. 17-27. The affair is going ahead on schedule and will contain exhibits from British, American, Canadian and European manufacturers.

Benelux: Active Steel Exporter

The Benelux union remains one of the most active steel exporters in Europe. A heavy foreign business enabled the union's producers to turn out 5.1 million net tons of steel in the first half, compared with 3.6 million tons in the first six months of 1950.

The steel consuming industry is booming, with about 40 per cent of its total output for export. Output of Belgian and Luxemburg products made from steel in the first half is now running at a rate that's 19 per cent better than in the first half of 1950 and 6 per cent better than in the same period in 1949.

More Industrial Diamonds

Larger imports, better salvaging methods brighten the future for users

HOPE for an adequate supply of industrial diamonds is being held out by the NPA to users in this country. Up to now the supply has been very tight, with a consistently rising demand during the first half of 1951.

The hope is based on a promise to ship more industrial diamonds to the U. S. by the London syndicate which controls the lion's share of the available supply. Largest source of industrial diamonds is the Belgian Congo; a major industrial use is in grinding.

A Matter of Price—One reason that American users have had a difficult time wooing an adequate supply toward this country is the controlled U. S. price for the diamonds which ranges from $1.60 to $1.80 a carat compared with the $8 to $10 paid by Europeans. Ways of balancing supply and demand were discussed at a meeting of the Industrial Diamonds Industry Advisory Committee with the NPA. The group is considering a suggestion for an NPA-sponsored educational program aimed at increasing the use of coolants during grinding operations. Wet grinding with metal-bonded wheels can extend the life of a grinding wheel as much as 400 per cent.

A Matter of Salvage—Assistance of NPA's Salvage Division in developing new methods of recovering industrial diamonds from waste material was requested at the meeting. The industry committee points out that current techniques for reclaiming industrial diamonds permit the recovery of $2\frac{1}{2}$ times as many diamonds as was possible during World War II.

To permit a more accurate forecast of future requirements for industrial diamonds, 1850 questionnaires have been sent to all known consumers and dealers, requesting information on inventories and past usage.

More Auto Scrap This Year

Receipts of auto wrecker scrap may be 30 per cent higher this year than last. Old jalopies given up for junk may add 3.9 million gross tons of scrap to the nation's depleted scrap reserves. The tonnage estimate is based on a sampling of unprepared iron and steel scrap by dealers all over the country and was passed along by Edwin C. Barringer, executive vice president of the Institute of Scrap Iron & Steel Inc.

The Reason Why—The increased receipts result from increased pressure on auto wreckers for the material and because the scrapping of old cars has increased slightly over what it has been at any other previous time since the end of World War II. The higher rate of scrapping is caused primarily by the heavy production of automobiles in 1950 and early 1951. An automobile is kept now about twice as long as it was before World War II. Before the war the average age of cars as they were scrapped was about seven years; now that has been lengthened to nearly 14 years.

Two principal hurdles to be jumped before the volume of auto wrecker scrap can be increased still more are the high labor charge for doing the actual scrapping job and the reluctance of most municipalities to relax their ordinances forbidding the burning of automobile bodies, to eliminate nonmetallic components, within the city limits.

FLYING DESKS. Three large trailers made by Trailmobile Inc., Cincinnati, disgorged their loads of steel desks into an Air Force C-124A Globemaster II for shipment to Castle Air Force Base, Merced, Calif. The Trailmobile trailers, carrying a 20,800-pound consignment of 72 steel desks, were backed up into the nose of the huge cargo plane and unloaded in less than two hours. Part of the cargo was lifted eight at a time into the fuselage by an electric elevator. The entire shipment was delivered the same day after a non-stop flight from Cincinnati

Crisis in Selenium

NPA looks for a way to relieve shortage of metal which conducts electricity in one direction

A NEW allocating system for selenium is now in the works at NPA. The system will attempt to avert a shortage which is fast becoming critical.

As production of the rare metal falls further behind the 1 million pound estimate for 1951 and demand stands at 160 per cent of supply, the old directive method of allocating selenium is no longer workable.

Affected by Copper—Supplies undoubtedly will become more depleted as one prime producer has ceased making selenium and because of recent work stoppages in the copper industry. Selenium is a by-product of certain copper refining operations.

Selenium has the unique property of transmitting a current of electricity in one direction only. It is widely used in rectifiers by the electronics industry to convert alternating current to direct current. Rectifiers are an integral part of battery chargers, fire alarms, traffic controls, radio and television sets, radar units, and power equipment of all sorts.

The metal is also used in glass manufacture for such items as milk bottles, food containers, colored glass ware, table wares and railroad equipment. Selenium is used, too, in the production of stainless steel (one of the largest quantity uses), rubber, chemicals, and ceramics.

What Manufacturers Say—Manufacturers of table and crystal glassware say that any further limitations on the use of selenium would be injurious to their business, and in some cases might lead to shutdowns.

A representative group of manufacturers of selenium rectifiers told the NPA their stocks of selenium had declined to as low as a three-day supply and that there is a possibility that all DO rated orders will not be filled.

No Other Relief — Exploratory work is being conducted by the government to develop new sources of selenium and experimentation with manganese and other minerals in the making of glass has been tried. No immediate relief in the shortage has come forth from these efforts. A type of rare earth, cerium oxide, would be satisfactory for glass making but investigation has proved that there is not enough of it available to supply even one of the smaller glass plants for a year.

So far there is no acceptable substitute for selenium.

"BOGIE" MAN?: Under this inspector are steel "bogie" wheels, used on all U.S. Army half-tracks. He looks them over before solid rubber tires are vulcanized to the rims by B. F. Goodrich Co. The wheels carry the weight of the vehicles, riding within rotating rubber band tracks that provide an endless rubber path on cross-country runs. Many thousands of "bogie" wheels are processed by the rubber company at its Los Angeles and other plants

Defense Pools Progress Report: Things Look Good

REVIVED less than six month also, defense production pools are still in various stages of development. They are patterned after those of World War II days.

Five have been approved so far by NPA's Pooling Section, Office of Small Business.

Approval is forthcoming on a sixth organization: Mil-Fin Inc., Waukegan, Ill. A seventh application is pending approval. Interest in production pools is high, says the Pooling Section; requests for its booklet "Pooling Production for Defense" (published in July) and other information are coming from all parts of the country. The agency is following progress of the new-born organizations closely to discover shorter paths through the maze of government requirements.

Status—Three pools are still in organizational stages of development; the others have already landed government work. One pool has over 100 members. All organizations are swelling in size and none has reported withdrawals.

Volume is still quite low; top pool still has less than $2 million in defense orders. That's higher volume (and more contracts) than it had during the entire first year of operation during World War II. One pool reports "no orders as yet," but tells of "important developments pending."

Modus Operandi—Products manufactured range from molded rubber products and packing boxes to aircraft components and electronic test sets. Parts of each new contract are distributed to member companies having open capacities and facilities to handle them. The pooling organization doesn't handle all defense contracts for all of its members—some bid directly on procurements if they can handle the job alone.

To line up defense work, pools use orthodox means: Brochures, written solicitations, personal contacts with procurement officers. Once the first few contracts are landed, the sailing becomes smoother—if the subcontract work is distributed equitably.

Advice—Getting off to a good start requires "the right spirit and lots of hard work as well as confidence of the membership," says one organization. Another recommends "patience and fortitude." The government scrutinizes applications from prospective pools carefully—to keep them within the anti-trust laws for one thing. Financing is another problem. Most pools depend on members (dues, initiation fees) for operating expenses. Commercial loans have been obtained by one pool; it is possible also to get V-loans from Federal Reserve banks.

HOLES
HOLES
and more HOLES
1500 of them

To be sure, this may be an unusual job. However, it proved the flexibility and practicability of the Bullard Spacer.

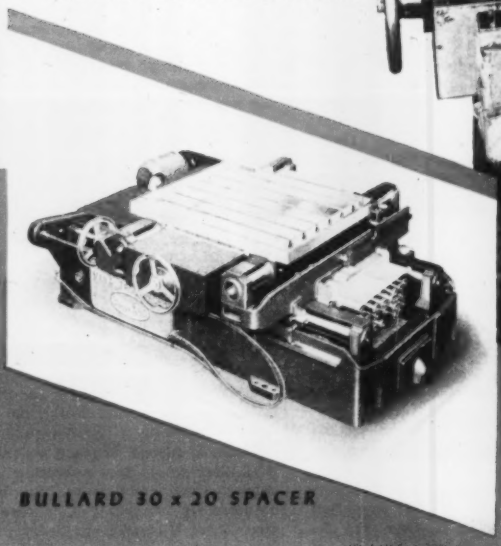
It required several combination of settings between the work location on the table and the drill saddle and arm.

However, the actual set-up and machining time figured 5-½ hours for the Spacer instead of 11-½ by the best previous method.

This case study illustrates the possibilities and wide application of the Bullard Spacer.

Here is a machine for spotting, drilling, counterboring, reaming, or tapping—without jigs.

Ask Bullard Engineers how your Jig Costs and problems can be reduced.



BULLARD 30 x 20 SPACER

THE
BULLARD
COMPANY
BRIDGEPORT 2, CONN.

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Future demand for autos should be even greater than now, so auto makers are willingly financing expansion which for the time being will be used for defense

DETROIT

IF AUTOMOBILE company analysts have figured correctly, demand for cars and trucks in future years will make 1950's production and sales totals look puny.

The industry's capacity last year was demonstrated to be in excess of ten million units. Production, of course, was not that great, but weekly output on several occasions was over 200,000. This meant that facilities were pushed to the limit, that overtime was the order of the day, that materials were scrounged, that other uneconomical practices were condoned.

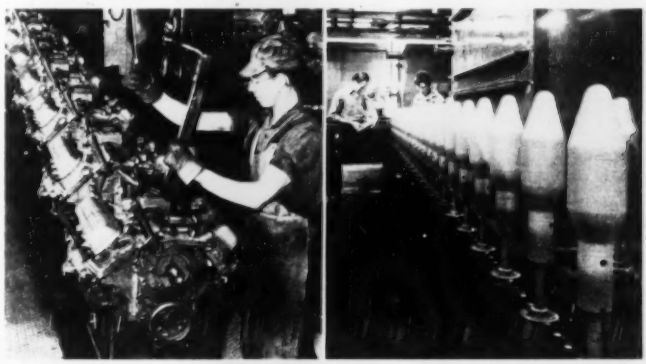
Dual Purpose—Autodom is working hard now to make sure those expedients won't be necessary again. While there is acceptance by automakers of the fact that defense production may be necessary in some volume for a good many years, they are trying in most cases to build facilities adaptable to peacetime use. Automen will admit that some of the plants they are building with their own money now may turn out to be white elephants; that's a gamble they're willing to take. Wherever possible, however, they are giving the architects the tough job of designing structures which have usefulness in either real peace or real war. Nobody likes a "standby" plant when it's only standing by.

It's fortunate that so many of the military needs are not too greatly unlike civilian goods, if not in application or appearance at least in manufacturing methods. If this were not the case, a tremendously high precentage of the facilities now abuilding for military production would have to be financed by the public, and in all likelihood the civilian economy necessary to support a military program would be in dire distress.

Shortsighted Fuss—A threat to the auto industry's expansion plans is the hullaballoo raised by organized labor when a program calls for construction of a new plant and transfer of some activities from one city to another. Walter Reuther is having a tough time keeping the UAW's quick-action boys from disrupting production on a wide front. Local 600 at Ford's Rouge was set to strike to keep part of the company's engine manufacture from being moved to Cleveland, even though the company and the union leaders were in basic agreement as to the move. In Flint where another strong anti-Reuther faction operates, the trouble-shooting UAW president a week ago Sunday told a union mass meeting that unemployment in auto plants will not last too long, and a labor shortage will develop in the area as soon as the General Motors' plants there are tooled for defense work. He described the action being taken by the union to lessen the impact of the change from civilian to military production, and pushed aside as unrealistic the suggestion made by some of the members that they should have a 30-hour week with 40-hours pay.

He would undoubtedly have liked to be able to tell this group of a new facility for Flint, announced last Tuesday by Chevrolet. The million-square-foot plant will be devoted to production of Wright aircraft engines — the 2700-hp R-3350-26W and the 3500-hp R-3350-30W. It will consist of a main manufacturing building 900 by 1120 feet, to house machining and subassembly operations, an office building and a cafeteria with garage facilities underneath. It will adjoin the present Chevrolet-Flint assembly plant on the city limits. Ground will be broken as soon as construction contracts are completed. H. E. Beyster & Associates Inc., Detroit, is the architect and engineer. This is the second large-scale expansion which the Air Force-Navy-Wright Engine contract has necessitated. Another million-square-foot plant at Buffalo is under construction.

Things To Come — What can be expected to happen when a new automotive facility gets into operation was described by Chrysler Vice President H. R. Matheny recently. His specific subject was



"COMBINED OPERATIONS": Oldsmobile-built rockets come down the conveyor lines in two assembly plants at Lansing, Mich. At left are Oldsmobile high compression "Rocket" engines being assembled in the Kettering Engine Plant, which is just celebrating its third anniversary. At right are 3.5-inch rockets for the Army's super bazooka coming down a conveyor line on their way to the infra red drying oven after painting. Rockets are only one phase of Olds' program of combined operations. Others are 90-millimeter tank guns and rotating parts for the J-65 Sapphire jet aircraft engine

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Chrysler's new engine plant, down river from Detroit, in Trenton, Mich. To contain 1,130,000 square feet, and employ about 6000 people, the operation was planned to take some of the load off the corporation's other engine-building facilities which have long been inadequate for the higher demand which the company feels is coming.

The observer can wonder why at this time additional engine-building capacity is necessary, and the company itself is not sure what use actually will be made of the plant. "We are proceeding on the assumption," says Mr. Matheny, "that we will be able to build engines at the Trenton plant, but we are ready to serve the national interest here if necessary." Although the south unit of the plant will probably be completed by the end of this month and the north unit of about the same size will be finished next year, part if not all of the facility may be devoted to some kind of defense work instead of passenger car and truck engines for which it is intended.

An operation of this size, irrespective of its use, is going to have a tremendous impact on the community. Mr. Matheny estimates that when the plant is in full swing, one out of every six of Trenton's industrial work-force will be a Chrysler employee. This is about the same ratio as in Detroit. Assuming that the average Chrysler worker in Trenton will have the same size family and spend his earnings in about the same pattern, he projects a $15 million yearly increase in retail trade directly caused. It means that established retail firms will get a definite increase in trade, and in all likelihood new retail firms and services will be attracted. These in turn will generate more work and business in the area.

More Steel in Michigan?

In recognition of the ever-widening circles of influence which new plants have on a community, the Michigan Economic Development Commission last summer undertook to determine what the State has to offer manufacturers and also what it is lacking. This survey, made by the University of Michigan's Survey Research Center, disclosed that among the state's most serious drawbacks was the lack of steel producing facilities. This was a majority opinion held among some 200 of the State's manufacturing companies, none of whom is an automaker. A committee was appointed within the commission to determine two points: Does the State need more steel capacity and what types of steel products are most needed, and can such capacity be installed and operated at a profit. Named to head the committee was William H. McGaughey, public relations director, Automobile Manufacturers Association.

The committee will investigate per-capita production and consumption of steel in the United States and in Michigan. It will seek figures as to the tonnage of various types of steel required in the State, and will try to make a sliding scale of requirements based on different levels of automobile production. It will attempt to determine the cost of new capacity, reaction of present steel producers and users to the idea of additional nearby sources of supply, and availability of materials and labor.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	494,810*	760,847
October		796,010
November		833,784
December		671,622
Week Ended	**1951**	**1950**
Sept. 1	137,479	188,072
Sept. 8	103,224	151,606
Sept. 15	136,150	185,421
Sept. 22	135,015	188,451
Sept. 29	115,319	187,030
Oct. 6	123,000*	174,234

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Auto Problems: Engineering

Looking ahead in a little different direction is Benson Ford, vice president of Ford Motor Co. and general manager of the Lincoln-Mercury Division. Frank to admit that he is no engineer and that no group of specialists in the automotive industry—be they manufacturing, sales, purchasing, industrial relations, engineering or financial personnel—can function without the others, he told more than 1600 SAE members who were visiting the engineering staff operations of Ford at Dearborn that future problems of the industry will predominantly be in the engineering realm.

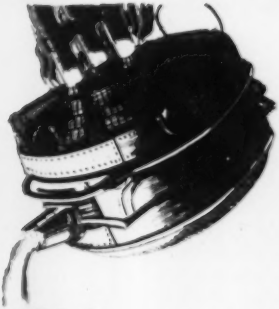
One of the most important problems will be with materials—especially metals, he said. Most engineers would agree, he asserted, that "we could use a new type of basic metal which is stronger, lighter and cheaper to produce than steel. Insofar as automobile manufacturing is concerned, the advantages of steel are offset by a great many disadvantages and, in time, those disadvantages could force us to find something better."

Aluminum is not necessarily what he was suggesting. "I've been told," he said, "that the use of aluminum is not entirely an answer because of cost of fabrication. But is that the extent of the possibilities?" He then asked: "And must we continue to rely on materials that are almost always scarce and likely to be scarce in the future? Have we done as much as we can with plastics or glass and other synthetics? What about the power plant — can we harness atomic power or solar energy for an automotive vehicle, or can diesel or jet propulsion be adopted? How about safety. Can automotive engineers go further, using radar or electronics to make cars immune to collisions?"

Fisher-Bullard Accord Reached

Agreement has been reached between Fisher Body Division of General Motors and Bullard Co., Bridgeport, Conn., over the body builder's participation in vertical turret lathe manufacture. Maximum production by Fisher of 50 cutmasters a month is called for, with its Pittsburgh plant to be used as the assembly point. Tool room facilities of seven Fisher Body plants in five cities—Pittsburgh, Cleveland, Hamilton, Flint and Detroit—will be used for parts and components fabrication.

The Symbol of Quality...



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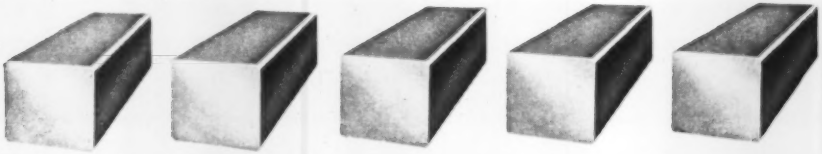

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The Business Trend

Difficulties encountered in shifting to a part defense and part peace economy cause industrial production index to slip moderately

INDUSTRY continues to adjust its gears to a part peace, part defense production. This adjustment, like many another, is not without its difficulties, its disappointments, and its dislocations. It's no little task to reach a new balance between the various segments of the economy.

So, we find production in some plants and some industries racing along at record speeds, while in others there's a lull. These contrasting conditions combined in such a manner as to depress STEEL's industrial production index in the week ended Sept. 29 to 212 per cent of the 1936-1939 average. In the preceding week the index registered 216 per cent.

This decline occurred while the steel industry's weekly outturn of steel for ingots and castings was the greatest since mid-August and while railroad carloadings and electricity output shot ahead at high levels. The sinker in the week's index was automobile production. It was the lowest since the Labor Day holiday week.

More and More Steel . . .

A further rise in steel production was scheduled for the week ended Oct. 6, but labor difficulties in one company's plants threatened to prevent the increase. If schedules could be adhered to, the above-capacity production of the industry for that week would total 2,051,000 net tons, the American Iron & Steel Institute said. Output in the week ended Sept. 29 was 2,041,000 tons. Thanks to capacity expansion, production now is running around 100,000 tons a week above that of this time last year.

Side Street for Autos . . .

All consumption of steel is now under government restrictions, and numerous producers of civilian goods are not getting all of that metal they need. Yet steel continues to pour forth at a record-breaking pace. That indicates a substantial portion of defense and defense-supporting work is well under way and swallowing up steel as fast as it can be produced. One of the industries having to step aside is the automobile makers. Although they report auto sales now are exceeding production they cut output in the week ended Sept. 29 to an estimated 115,319 passenger cars in the United States and Canada, says *Ward's Automotive Reports*. Reason: Materials shortages, attainment of NPA third-quarter production quotas, and taking of inventory.

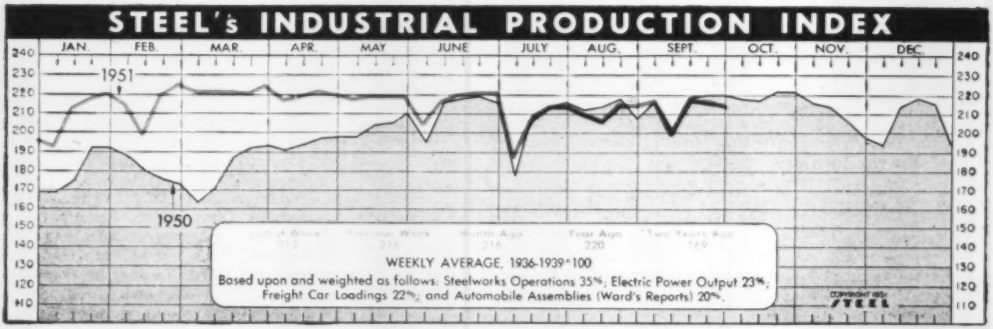
The first three quarters of this year yielded 5,396,000 vehicles from U. S. plants, compared with 6,015,000 in the like period of 1950.

Current Outlook . . .

Another indicator of progress in expanding industry and the economy to provide a good supply of guns and butter at the same time is electricity consumption. Increased industrial activity and a step-up in the use of electricity in the home and on the farm are keeping consumption of current 10 to 12 per cent above that of this time last year. And there is no visible end to the increase in de-

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.5	101.0	100.0	101.0
	Electric Power Distributed (million kilowatt hours)	7,102	7,014	7,146	6,503
	Bituminous Coal Production (daily av.—1000 tons)	1,817	1,810	1,800	1,922
	Petroleum Production (daily av.—1000 bbl)	6,310	6,298	6,232	5,903
	Construction Volume (ENR—Unit $1,000,000)	$335.1	$232.4	$257.4	$244.8
	Automobile and Truck Output (Ward's—number units)	115,319	135,015	137,479	187,030
	* Dates on request. † Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	870†	864	829	880
	Business Failures (Dun & Bradstreet, number)	154	160	164	148
	Currency in Circulation (in millions of dollars)‡	$28,137	$28,140	$28,034	$27,060
	Department Store Sales (changes from like wk. a yr. ago)‡	−1%	10%	−3%	+10%
	† Preliminary. ‡ Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$17,111	$18,734	$13,962	$16,262
	Federal Gross Debt (billions)	$257.1	$256.8	$256.6	$256.8
	Bond Volume, NYSE (millions)	$13.2	$14.2	$10.9	$17.9
	Stocks Sales, NYSE (thousands of shares)	7,834	10,180	7,357	10,659
	Loans and Investments (billions)†	$71.6	$70.7	$70.3	$69.5
	United States Gov't. Obligations Held (millions)†	$31,333	$30,722	$30,983	$34,869
	† Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.99
	STEEL's Nonferrous Metal Price Index‡	224.6	224.6	224.6	218.3
	All Commodities†	177.1	176.4	176.8	169.9
	Metals and Metal Products†	190.5	189.4	188.2	177.5
	† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100. †† 1935-1939=100.				



Week ended Sept. 29

mand for electrical energy, said A. A. Johnson, manager of Central Station Engineering for Westinghouse Electric Corp.

"Whether we have peace or war the electrical industry will continue to provide the power to turn the wheels of our great industrial nation," he pointed out. The electrical industry now backs up the average American industrial worker with from 7 to 8 horsepower of equipment to carry on his daily work, in effect giving each worker the equivalent of 350 men working for him, Mr. Johnson explained. And this figure will increase, he added.

From 1920 to 1951 installed generating capacity increased from about 13 million kilowatts to 75 million kilowatts. In the same time, generated kilowatt-hours increased from 10 billion to 360 billion. By 1961, it is expected that the installed generating capacity will reach 140 million kilowatts and the annual rate of generation over 600 billion kilowatt-hours, Mr. Johnson said.

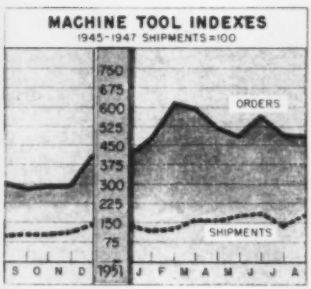
More Wash-Day Helpers . . .

While metals shortages are handicapping some companies so severely they are laying off employees, others are finding the sailing smoother.

The home laundry equipment industry, for instance, boosted its output of household washers, automatic dryers and ironers in August over that of July. Factory sales of standard-size household washers in August totaled 239,081 units, a 71 per cent advance over the 139,799 of July. Factory sales of automatic dryers in August were up 53 per cent over July, totaling 40,191 units compared with 26,268 in August. Sales of ironers totaled 17,200 units, up 55 per cent over July's 11,000.

More Radios, Fewer TVs . . .

Also up in August was radio production; television output, however,



Machine Tool Indexes

	New Orders		Shipments	
	1951	1950	1951	1950
Jan.	475.4	99.7	114.3	52.8
Feb.	515.5	89.2	123.8	56.1
Mar.	500.3	107.4	138.9	75.3
Apr.	516.1	98.9	157.7	61.6
May	483.0	116.4	175.1	82.5
June	558.8	124.1	182.8	91.9
July	490.6	253.1	144.7	68.3
Aug.	488.3	305.1	177.3	95.7
Sept.	...	280.6	...	101.6
Oct.	...	289.6	...	100.9
Nov.	...	291.9	...	110.9
Dec.	...	310.1	...	125.7

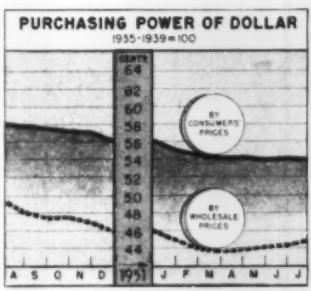
National Machine Tool Builders' Assn.

Durable Goods Orders, Sales

In Millions of Dollars

	New Orders		Sales*	
	1951	1950	1951	1950
Jan.	15,123	7,479	10,398	6,817
Feb.	13,153	7,213	10,338	7,103
Mar.	15,478	8,508	10,993	7,643
Apr.	12,614	7,857	10,532	7,488
May	11,773	8,514	11,077	8,605
June	12,018	9,814	10,660	9,030
July	10,413	10,553	9,748	8,670
Aug.	...	13,863	...	10,060
Sept.	...	11,500	...	9,392
Oct.	...	12,171	...	9,671
Nov.	...	10,621	...	9,730
Dec.	...	11,379	...	9,791

*Seasonally adjusted. U. S. Office of Business Economics.



Purchasing Power of the Dollar

Cents, as measured by:

	Wholesale Prices		Consumers' Prices	
	1951	1950	1951	1950
Jan.	44.6	53.1	55.1	59.5
Feb.	43.8	52.7	54.4	59.6
Mar.	43.7	52.7	54.2	59.4
Apr.	43.8	52.6	54.2	59.3
May	44.0	51.6	53.9	59.1
June	44.2	51.2	54.0	58.8
July	44.8	49.4	53.9	58.1
Aug.	...	48.3	...	57.7
Sept.	...	47.5	...	57.3
Oct.	...	47.5	...	56.9
Nov.	...	46.8	...	56.7
Dec.	...	45.8	...	55.9

U. S. Office of Business Economics

Charts—Copyright 1951, STEEL

was down. Radio production in August was 563,407 sets, compared with 548,495 in July, the Radio-Television Manufacturers Association reports. Television output in August was 146,705 sets, compared with 152,306 in July.

Production of radio and television receivers in the first eight months of 1951 decreased 3.5 per cent and 13 per cent, respectively, under the output in the corresponding period of 1950. Radio receiver production in the first eight months of 1951 amounted to 8,977,232 units, compared with 9,303,000 sets in the like period of last year.

Boom for Structurals . . .

Reflecting the big expansion in the nation's industrial plant, August shipments of fabricated structural steel totaled 240,072 tons, the American Institute of Steel Construction reports. This is only slightly less than the June record of 257,066 tons which represented the largest month since 1930.

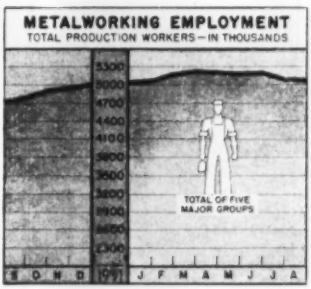
Backlog of orders for fabricated steel totaled 2,748,315 tons, compared with 1,626,372 tons at the corresponding time last year.

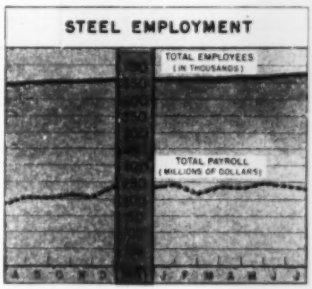
Trends Fore and Aft . . .

Third quarter industrial building costs, as reflected by the Austin Co.'s index, remained unchanged for the second successive quarter at 182 per cent of the 1926 average . . . The government's wholesale price index in the week ended Sept. 25 rose to the highest level since mid-August, 177.1 per cent of the 1926 average . . . New orders for industrial furnaces tapered off in August, totaling $4,850,393 for fuel fired (except for hot-rolling steel) and $3,891,339 for electric furnaces . . . New strikes in August totaled 425, the same number as in July. Number of employees involved in new stoppages in August also remained at the July level, 250,000. Man-days idle increased, however, from 1,750,000 in July to 2,750,000 in August, the highest idleness recorded in any month in 1951 . . . Foremen's earnings have risen 11.6 per cent since 1949, a survey by the Associated Industries of Cleveland reveals.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Durable Goods Aug.6	Indus. Production....Oct.1	Refrigerators Oct.1
Fab. Struc. Steel...Sept.10	Ironers Sept.17	Steel Castings Sept.10
Foundry Equip. ...Sept.24	Malleable Castings..Sept.10	Steel Forgings Aug.20
Freight Cars Sept.24	Prices Oct.1	Steel Shipments....Aug.27
Furnaces, Indus. ..Sept.17	Pumps, New Orders..July9	Vacuum Cleaners Oct.1
Furnaces, W. Air..Sept.17	Radio, TV Aug.20	Wages, Metalwkg...Aug.13
Gear Sales Sept.17	Ranges, Elec. Sept.24	Washers Sept.17
Gray Iron Castings Sept.10	Ranges, Gas Sept.24	Water Heaters Oct.1





Metalworking Employment

Production Workers—Five Major Groups

1950	Prim. Mtls.	Fab. Prod.	Mach. inery	Elec. Mch.	Trans. Equip.
Aug.	1,086	814	1,060	655	1,118
Sept.	1,105	837	1,050	673	1,134
Oct.	1,117	850	1,104	710	1,157
Nov.	1,125	849	1,133	720	1,128
Dec.	1,142	852	1,163	724	1,160
1951					
Jan.	1,149	847	1,192	711	1,175
Feb.	1,153	853	1,219	716	1,228
Mar.	1,158	858	1,228	724	1,259
Apr.	1,159	858	1,234	717	1,244
May	1,161	850	1,246	709	1,231
June	1,171	843	1,253	703	1,235
July	1,154	814	1,233	689	1,263
Aug.	1,165	810	1,214	646	1,204

U. S. Bureau of Labor Statistics

Steel Employment, Payrolls

	Employees† in Thousands		Payrolls in Millions	
	1951	1950	1951	1950
Jan.	657	609	$245.3	$189.3
Feb.	663	613	219.4	174.7
Mar.	663	616	238.3	190.0
Apr.	666	621	234.8	186.2
May	667	628	249.0	199.9
June	674	636	240.7	195.3
July	678	643	231.9	188.7
Aug.	...	649	....	206.6
Sept.	...	650	....	203.8
Oct.	...	650	....	212.2
Nov.	...	653	....	208.0
Dec.	...	657	....	235.0

† Monthly average. American Iron & Steel Institute.

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SPEED NUTS score "direct hit" on Globe Jet Target

How SPEED NUTS "shot down" cost of assembly, saved time and ended vibration-loosening problems on Globe Jet Powered aircraft targets.

Speeds attained by the Globe KD2G-2 jet target are high enough to provide the realistic touch of actual air-to-air or air-to-ship attacks. This sleek craft is the result of over three years of development work by Globe Corporation, Aircraft Division, Joliet, Illinois, in cooperation with the Navy Department, Bureau of Aeronautics.

Globe engineers had to plan assembly of the target with fasteners that could take intense vibration. Of all those tested, Tinnerman SPEED NUTS made the biggest hit. Not only did SPEED NUTS end vibration loosening problems, they also brought an average time savings of 48% per application over other methods.

Globe is justifiably proud of the jet target, one of the achievements that stands out in its 50th anniversary year. And Tinnerman is proud of its part in this success. Perhaps your company can use the valuable experience gained by Tinnerman on this and many other projects. Write for information on our comprehensive Fastening Analysis Service. TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. In Canada: Dominion Fasteners Limited, Hamilton. In Great Britain: Simmonds Aerocessories, Limited, Treforest, Wales.

SPEED CLAMPS attach hose to fitting of internal fuel line. Note low profile of one-piece clamp.
Tail cone is attached with 5 "U" type SPEED NUTS which hold themselves in bolt receiving position for blind assembly.
More than 23 SPEED NUTS are used in various locations on the KD2G-2 target. They must hold tight under vibrations created by the jet engine pulsating at 70 to 80 cycles per second, catapult shocks of 10 to 15 g.s acceleration, and the impact of parachute landings at end of each mission.
"AN" receptacles on junction box are secured by SPEED NUT retainer rings.
TINNERMAN Speed Nuts
FASTEST THING IN FASTENINGS

Men of Industry

F. I. GOODRICH
. . . gen. mgr., Eaton Spring Div.

Eaton Mfg. Co. announces these promotions at its Spring Division in Detroit: **F. I. Goodrich** succeeds the late **W. H. Wallace** as general manager; **E. H. Lindeman** becomes assistant general manager in charge of leaf springs, and **H. H. Clark** will be assistant general manager in charge of coil springs.

James H. Ingersoll was elected vice president of **Ingersoll Products Division,** Borg-Warner Corp., Chicago. He previously was assistant to the president of the division, and has served since 1945 in various capacities at the Ingersoll plant in Chicago.

H. V. Rasmussen was appointed executive engineer at the Wellsville, N. Y., plant of **Worthington Pump & Machinery Corp.** He spent a number of years with both Westinghouse Electric Corp. and De Laval Steam Turbine Co. During World War II he was a consultant for National Defense Research at Columbia University, and a representative on both the Navy-Industry Committee on propulsion turbines and the advisory committee of International Electro-Technical Commission.

Elmer E. Hightower has joined the Detroit sales staff of **Lapeer Mfg. Co.**

Carl A. Ten Hoopen Sr. was appointed Pacific Coast sales manager of the Cyclone Fence Division of **American Steel & Wire Co.** He was assistant general sales manager of the division. **Raymond G. Russell,** Pacific Coast vice president of Cyclone Fence, Oakland, Calif., has retired after more than 40 years' service with the wire company.

ROBERT BARIT
. . . Hudson Motor Car V. P.-purchasing

Robert Barit was elected vice president in charge of purchasing for **Hudson Motor Car Co.,** Detroit. He succeeds **G. W. Munger,** retired after more than 32 years of service. Mr. Barit has been in charge of the purchasing department under Mr. Munger's direction for several years with the title of purchasing agent.

Dr. Charles H. Moore was appointed head of the metal and ceramic division of **P. R. Mallory & Co. Inc.,** Indianapolis. Prior to Sept. 15 when he joined Mallory, he was technical director of National Lead Co. of Ohio. Dr. Moore invented and developed Rutile gems, often referred to as Titania, and has had extensive experience with titanium in addition to his work with the gems which are made from titanium dioxide. Previous to his years with National Lead he was visiting professor at Rutgers University, conducting courses in crystal chemistry of ceramic materials.

DR. CHARLES H. MOORE
. . . heads a div. at P. R. Mallory

L. K. STRINGHAM
. . . Lincoln Electric chief engineer

L. K. Stringham was appointed chief engineer for **Lincoln Electric Co.,** Cleveland. **G. G. Landis** continues as engineering vice president. Mr. Stringham has been with Lincoln since 1933. For the last two years he has been director of welding development.

Joel Hunter Jr. was appointed vice president in charge of finance of **Crucible Steel Co. of America,** New York.

Whirlpool Corp., St. Joseph, Mich., elected **Kenneth MacGrath** general vice president, a new position, and **Donald W. Alexander** vice president in charge of production. Mr. MacGrath was manufacturing vice president, and Mr. Alexander was formerly vice president of P. R. Mallory & Co. Inc.

W. M. Pearce was named manager of **Kaiser-Frazer Corp.'s** new stamping division now nearing completion at Shadyside, O. He was manager of the K-F car assembly plant at Portland, Oreg., and has been associated with various Kaiser interests for the last 13 years.

Robert C. Becherer was elected executive vice president of **Link-Belt Co.,** Chicago. He was elected vice president last March and since 1947 has been general manager of the company's Ewart plant in Indianapolis. **Richard E. Whinrey,** assistant general manager of the Ewart plant, succeeds Mr. Becherer as general manager.

Dale C. Hergert was named acting purchasing agent for the Nashville,

Tenn., plant of the Crosley Division of **Avco Mfg. Corp.** and assumes his new duties Oct. 15. He succeeds **A. A. Price.**

Charles H. Cecil was appointed vice president of **Northwestern Steel & Wire Co.,** Sterling, Ill. He formerly was with Bethlehem Steel Co., serving first in the operating department and later in the sales department.

Anthony G. Ruediger was appointed director of procurement for **Carrier Corp.,** Syracuse, N. Y. He takes over post vacated by **Ralph H. Anderson** who was granted a leave of absence to fill a government position.

M. W. Barlow resigned as sales manager of British Electro Metallurgical Co. Ltd., Sheffield, England, to join **Foundry Services Ltd.,** Birmingham, England. He will be responsible for both manufacture and sales of Foseco ferroalloy products.

Menasco Mfg. Co., Burbank, Calif., elected as directors **Robert D. Cavanaugh** and **Franklin C. Wolfe.**

Horace W. Potter, senior technical assistant of the open-hearth department of **Lukens Steel Co.,** Coatesville, Pa., was promoted to assistant to the open-hearth superintendent.

John C. Barnes, formerly vice president for sales, National Radiator Co., purchased the capital stock of **Atlantic Steel Boiler Co.,** Philadelphia, and will be president of the organization which will operate under the name of Atlantic Steel Boiler Co. Inc. **W. A. Bartley,** who founded the company in 1939, announces plans for permanent retirement from the heating industry. The personnel and facilities of the original company are being retained.

JOHN C. BARNES
. . . purchases Atlantic Steel Boiler

W. C. LANDIS
. . . gen. mgr., Air Brake Division

Westinghouse Air Brake Co., Wilmerding, Pa., appointed **W. C. Landis** general manager of its Air Brake Division, and **A. M. Wiggins,** general manager of its Union Switch & Signal Division. Both men are vice presidents. Mr. Landis will be responsible for operations and earnings of Air Brake, which operates plants at Wilmerding and Emeryville, Calif. Mr. Wiggins will have similar responsibilities for the Swissvale, Pa., operations. These two divisions were created last July following merger of Westinghouse Air Brake Co., Union Switch & Signal Co. and Westinghouse Pacific Coast Brake Co.

Janette Mfg. Co., Chicago, appointed **O. J. Maag** sales manager, and **F. C. Hartmann,** assistant sales manager.

Howe Scale Co., Rutland, Vt., appointed **Lierd E. Grant** manager of the Los Angeles branch. He will continue as manager of the San Francisco branch where **William J. Tucey** was appointed assistant branch manager. **O. B. Collins** becomes manager of the Atlanta branch, and **Jack H. Brewer,** manager of the Minneapolis branch.

Reliance Electric & Engineering Co., Cleveland, appointed four buyers to its purchasing department. They are: **Nolan B. Barnard, James H. Himes, Morley Hitchcock,** and **William F. Simmonds.**

Phillip K. Coe, account executive in the **Goodyear Tire & Rubber Co.'s** Detroit manufacturers sales office, was appointed assistant to the vice president.

Hickman, Williams & Co., Chicago, elected **Norman E. Craig** and **John H. Tressler** to its board of directors. Mr. Craig is resident manager of the New York office, and Mr. Tressler, resident manager, Cleveland office.

A. M. WIGGINS
. . . gen. mgr., Union Switch & Signal

J. H. Rasmussen was appointed vice president in charge of sales of cooking and heating appliances at **Perfection Stove Co.,** Cleveland.

Robert S. Strawsburg was appointed district manager of the Buffalo office of **Warner & Swasey Co.** He has been European resident field engineer for the company with headquarters in Paris since 1948, and returned in January to the company's East Orange, N. J., office.

James H. Wolcott was appointed sales manager, machinery division, **Reed-Prentice Corp.,** Worcester, Mass. He transfers from Chicago Oct. 15, where, since 1950, he has been branch sales office manager.

Olavi J. Warpula was appointed resident demonstrator for the grinding machine division of **Norton Co.,** Worcester, Mass. He will be assigned to the Detroit office replacing **George B. Taft,** retired.

Harris C. Miller was assigned to sales territory comprising upper New York state and western Pennsylvania by **Hooker Electrochemical Co.** Headquarters will be at Niagara Falls, N. Y.

E. J. Campbell was appointed midwestern district sales manager, **Wolverine Tube Division,** Calumet & Hecla Consolidated Copper Co. He continues headquarters at Chicago.

Woodhouse Chain Works, Trenton, N. J., one of the Round Chain Companies, appointed **Otto F. Bender** district sales manager, Philadelphia area. He spent the last three years representing Crane & Hoist Division,

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USUALLY COST LESS AT THE POINT OF ASSEMBLY

Upset steering spindle, weighs 16 lbs; is 14" long with head 5" in diameter. Lug on head presents unusual forging problem.

Consult our engineers when you are contemplating conversion to forgings or when you are in need of reliable forging service.

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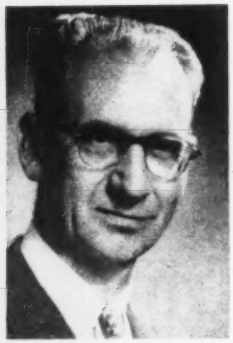
OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE



JOHAN A. MULLER
. . . joins Lewis Welding & Engineering

JAY S. HUDSON
. . . asst. to exec. V. P. at Willard

A. E. WEROLIN
. . . V. P. of National Motor Bearing

Manning, Maxwell & Moore, as a field engineer in that region.

Johan A. Muller joined **Lewis Welding & Engineering Corp.,** Bedford, O., as head of a newly formed development department. Mr. Muller, who holds many U. S. patents covering various phases of his work, has specialized in design and development of hydraulic equipment, particularly in its application to plastics and rubber manufacturing industry.

Wm. K. Stamets Co., Pittsburgh, appointed **A. L. Lentz** as sales manager. He was formerly Pittsburgh representative of Cincinnati Milling Machine Co.

John C. Ewer was appointed managing director of **Norton Grinding Wheel Co. Ltd.,** Welwyn Garden City, Herts, England. He has served as assistant general manager of the English plant since 1950.

Jay S. Hudson was appointed assistant to the executive vice president of **Willard Storage Battery Co.,** Cleveland. Formerly in the Willard legal department, Mr. Hudson joined the company in 1939 and has served for several years as legal adviser for labor relations and federal laws and regulations.

Raymond E. Zimmerman, since 1950 chief coal preparation engineer for Koppers Co., was appointed chief preparation engineer in the coal division of **U. S. Steel Co.,** Pittsburgh.

Robert P. Bremner was named assistant to the vice president-operations, **Youngstown Sheet & Tube Co.,** Youngstown.

Plasteel Products Corp. appointed **John H. Wallace Jr.** sales representative for the Pittsburgh area, with headquarters at 1411 Berger Bldg., Pittsburgh.

A. E. Werolin, formerly managing partner of McKinsey & Co., management consultant, was elected vice president of **National Motor Bearing Co. Inc.,** Redwood City, Calif. He will be in charge of administration and planning.

Harold H. Jeske was appointed director of manufacturing for **Gruen Watch Co.,** Cincinnati. All manufacturing operations in both the watch and defense divisions will be under his direction. Prior to his connection with Gruen, Mr. Jeske was vice president and general manager of O. D. Jennings Co., and previously spent 12 years with Hotpoint Inc.

William G. Polley was appointed district sales manager at Atlanta for **Acme Steel Co.,** Chicago, to succeed the late **Clarence A. Carrell.** He is replaced as southern area special representative by **Charles R. Lammers,** who transfers from Buffalo.

OBITUARIES...

George Mace, 44, advertising manager of **Unit Crane & Shovel Corp.,** Milwaukee, died Sept. 27 following a heart attack.

Donald P. McCredie, 63, chief engineer for the Fleetwood plant of **Fisher Body Division,** General Motors Corp., Detroit, died Sept. 28. He was employed by GM for 33 years.

William S. Hammond, 75, president of **Consolidated Car Heating Co.,** Albany, N. Y., died Sept. 24.

Charles J. Reynolds, 60, mill representative for **Inland Steel Co.,** Chicago, died Sept. 27. He had been with the company since 1945.

Kenneth R. Douglas, who retired in August as vice president of **Acme Metal Products Corp.,** Chicago, died Sept. 26.

Victor A. Ryan, director of research, **Crown Cork & Seal Co.,** Baltimore, died Sept. 20.

Edward J. Mershon, an associate of **Pittsburgh-Des Moines Steel Co.,** Pittsburgh, since 1916, died Sept. 25. He specialized in elevated steel tanks and steel grandstands.

Arthur E. Beecraft, associated for 40 years with **Drummond, McCall & Co.,** Toronto, Ont., iron and steel products, and lately an executive of the company, died Sept. 24.

George G. Mize, 56, chief engineer, **Diamond Chain Co. Inc.,** Indianapolis, died Sept. 4. He had been associated with the company since 1919 and chief engineer since 1922. An authority on roller chain, he had for the last five years been engaged by Armour Research Foundation, Chicago, as a consultant on research in fatigue and wear of metals and mechanical development in particular.

W. Alfred Robinson, 42, personnel and safety director, **Morrison Steel Products Inc.,** Buffalo, died Sept. 22.

Charles F. Weber, 69, who retired in January as a vice president and treasurer of **Allied Chemical & Dye Corp.,** New York, died Sept. 29 in Elmsford, N. Y.

John C. Huffman, 48, district and regional manager for **Braebrun Alloy Steel Co.** at Cleveland, died Sept. 30 as a result of injuries received in an automobile accident.

Presenting: A NEW HOT WORKING DIE STEEL FOR PRESSES AND UPSETTERS—

PRESTEM

PRESS DIE INSERT

PRESS DIE

UPSETTER DIE

. . . ANOTHER Heppenstall "FIRST"!

The makers of Hardtem—first prehardened die block for drop hammer forgings—now introduce "*Prestem*", a new steel analysis developed especially for the hot working of steels in forging presses and upsetters.

Prestem is available in the form of blocks and bars for solid press dies, insert dies, upsetter dies, and punches. It machines readily at high hardness . . . has high impact resistance . . . can be water cooled during forging operations.

Results obtained the past year by three large automotive forge shops indicate that *Prestem* dies withstand abrasion and wear at high temperatures . . . resist heat checking during long runs . . . continually produce better quality forgings.

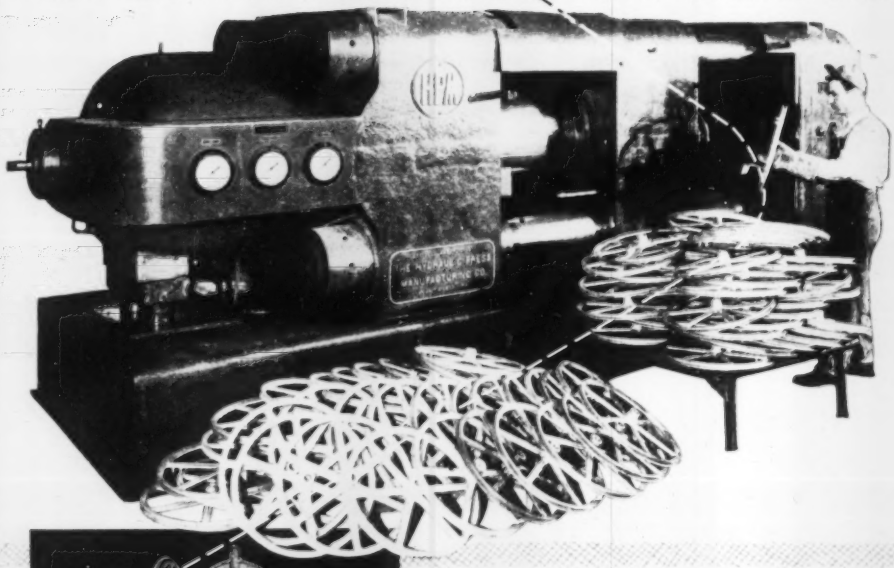
SEE AND HEAR
. . . the Prestem Story at the
National Metal Exposition
October 15 to 19
Detroit, Michigan

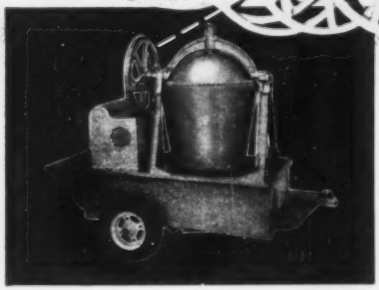
You are cordially invited
to the Heppenstall Exhibit
No. C-122 Bldg. C.

Heppenstall —the most dependable name in die blocks

PITTSBURGH 1, PENNA.

CUT PARTS COSTS WITH H-P-M DIE-CASTING MACHINES...





● Illustrated above is the die cast pulley wheel employed by Wright Engineering and Supply Company of Denver for a light weight portable mixer. Increased production and improved product quality has been Wright's experience since they installed this large H-P-M Die Casting Machine . . . and reaped the benefits that such H-P-M users as Hoover, General Electric, Westinghouse, Chrysler and many others enjoy.

If you haven't considered die cast parts, now is the time to investigate the process that has reduced costs and "upped" product quality for scores of manufacturers. As for the equipment, H-P-M Die Casting Machines have long been leaders in the field. There's a complete range of models (4 lbs. — 20 lbs. shots) for aluminum, zinc, brass and magnesium castings designed with proven H-P-M features for profitable operation. Call in your H-P-M engineer today for full particulars.

HPM

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Makers of Presses for the Metal Working and Processing Industries - Plastics Molding Presses - Die Casting Machines Hydraulic Pumps, Valves and Power Units.

SERVING INDUSTRY THROUGH HYDRAULICS

Production and Engineering
NEWS AT A GLANCE

WORLD CONGRESS OF IDEAS— For the first time in history an American technical society has gone all-out to assemble a representative worldwide group of engineers, metallurgists and technical experts in the metalworking field, with the idea of promoting an interchange of ideas on metals conservation and utilization in the light of today's conditions. It is perhaps entirely appropriate that Detroit should be the scene of the World Metallurgical Congress, with the kickoff scheduled Saturday.

Both ferrous and nonferrous plants, producing and fabricating, throughout the free nations of the world are wrestling with problems similar to those in the U.S.: Shortage of metallics, insufficiency of skilled technicians and capable management, and demand for finished goods outrunning supply.

Foreign conferees to the WMC, carefully chosen by their respective governments, with the aid of technical associations and institutes, have been touring U.S. industry since Sept. 13, seeing at first-hand the mass production techniques they have heard so much about. Strangely enough many of them, crammed full of the wonders of industrial America, at the tour's end expressed a desire to get some intimate glimpses of family life in this country; probably wondering whether mass production extended to the hearthside.

A complete roundup of the forthcoming congress and exposition, with its multitude of technical sessions, educational courses, seminars and round-tables reinforced by 6½ acres of wares displayed by 400 exhibitors, will convince anyone that this will be the "bestest and the mostest" of the metal shows ever unfolded. —pp. 116-132

STAINLESS SPRINGS FOR 'CHUTES— Type 302 stainless steel spring wire has replaced rubber on parachute straps being supplied the Air Force. Rubber was found to lose elasticity in extremes of temperature and humidity, factors of course having no effect on stainless steel springs. There are five springs in the strap, covered with fabric padding.

PLASTICS FOR A SOFT RIDE— Draw your own conclusions: The Erie railroad is starting tests in one of its freight yards with rails laid on tieplates of molded plastic having a laminated fiberglass base. Supplier of the plastic "believes" the plates will outlast the conventional steel types. They weigh one-fifth as much, are unaffected by corrosive media. How about cracking under extremes of temperature? or creep under heavy loads?

NITROGEN PROVIDER— Calcium cyanamid is a not too widely known although nonetheless potent "flavoring" material in steel. Its principal function is to increase nitrogen content and thereby promote aging or precipitation hardening, stimulate grain sensitivity and increase hardness and tensile strength. It is used in both alloy and carbon steel heats as a ladle or runner addition, in open-hearth and electric furnaces. Tin plate producers are the largest users, the cyanamid increasing temper hardness with a minimum of cold rolling. It will also reduce sulphur and oxygen content of certain grades of steel. —p. 138

WORKS UNDER WATER— A new submersible type water pump is in production at an Arkansas plant. Pump and motor operate completely submerged in water and are both cooled and lubricated by the water. The pump is self-priming, requires no jets, rods or shafts and is claimed to be free from motor noises and vibration.

KEEP COOL WITH HYDROGEN— Blowing hydrogen gas at high velocity through specially constructed hollow generator coils is said to make it possible to increase turbogenerator ratings by as much as one half. Particularly applicable to units for ratings of 90,000 kw and up, the method reduces to almost zero the heat flow through the coil insulation. Thus the temperature of the copper coils is determined by the temperature of the gas and the heat transfer coefficient from copper to hydrogen. Therefore, for a given maximum temperature rise, it will be possible to pass more current through the coils. Westinghouse is enthused over the deal.

MORE USES FOR WOOD OF LIFE— Lignum vitae reportedly is being substituted for critical materials and plastics in mechanical and diversified industrial applications. It is the hardest and heaviest wood that grows, having origin in the tropics and being imported in log form. One-third of its volume is natural resin, supplying a self-lubricating quality which has made it a popular choice for water lubricated bearings in marine and steel mill equipment. Specific gravity is 1.3, modulus of rupture 11,200 psi, maximum crushing strength 10,480 psi, and working pressures of 2000 psi can be supported handily. Lignum vitae has good resistance to mild corrosive attack, can be machined dry with conventional equipment to fairly close tolerances. It is not recommended for use without coolant at over 150° F.

WANT A WATER-BURNER?— Two Salt Lake City "inventors" are ready to collect a few million dollars from a water-cracking machine they cooked up one evening while trying to keep warm in a neighborhood garage. Nothing to it, according to the sputtering press wires; just pass water through a series of coils heated by any kind of fuel and—bingo—out comes hydrogen and oxygen. They have even been incorporated—for $100,000—and can now be found in a laboratory at the Salt Lake airport, if you are interested. Meanwhile pass the spinach!

A.H.A.

Metalworking Outlook—p. 79 Market Outlook—p. 261

ONE WORLD IN

Metals specialists from free nations converge to inspect U.S. industrial power in hope of finding solutions to their own problems and to pass along fruits of their research. Shortage of metallics is a universal stumbling block. Steps are being taken to expand and consolidate co-operative metallurgical studies

ONE world metallurgy is a high-sounding phrase and perhaps is one on which the destiny of free nations may rest in part. From a practical standpoint it is probably little more than a distant dream, although the World Metallurgical Congress may provide the initial impetus toward making this dream a reality.

Barriers to metallurgical federation are myriad. Difficulties of language alone are tremendous. Almost complete lack of standardization on specifications for materials, components and finished products, as well as test and inspection methods covering them, is a major hurdle to be cleared. Customs barriers, nationalistic tendencies and the ever-present elements of communism in working classes are other disturbing factors. Insufficiency of managerial and administrative talent holds back the progress of metalworking in many countries, along with shortages either of trained younger engineers or of qualified educators to school them.

Aid in Reverse—The Marshall plan with its billions of dollars of credits advanced to European nations, has been of definite assistance in getting the economic system there off dead center, but it will take a lot more than that to restore robust health to industries on the Continent. In fact, cases can be cited, in France and Italy for example, where Marshall plan funds have worked just the reverse of their intended purpose. A company would install some American-made equipment and train employes in its operation, only to have communists whisper to workers, in effect: "See, that is why you are starving. Your bosses buy American machines and our country's machine-building industry dies."

The crying need for standardization and uniformity of nomenclature is evidenced throughout Europe. Take the case of the big Ansaldo plants in northern Italy. There are 12 of them, employing around 20,000, and building steam boilers, turbines and diesel engines, the latter in stationary types up to 22,000 hp and in smaller units for naval and maritime craft, ranging in horsepower from 10 to 1800. Recently one of the company's plants received an order from Yugoslavia for ten engines to be installed in small fishing boats. The engines were all built up and in stock, ready for shipment. They were made to specifications of the Italian registry; however, the buyer was forced to insist on their meeting French specifications for such power plants. To fill this requirement would have meant literally cutting apart one engine for destructive tests, then perhaps modifying the rest. The result was a complete impasse—the Yugoslavian buyers waiting with money in hand, the engines ready to be shipped, but no common meeting ground on specifications. Result: No sale.

In specifying various types of steel, particularly welding grades, and in establishing test limits on

ALAN LECKIE
British Iron & Steel Research Association
London, England
. . teams join in open-hearth flame radiation studies

KAJ ARN
Northern Cable & Wire Works
Copenhagen, Denmark
. . too little competition, shortage of managers

LOUIS DU ROY DEBLICQUY
Trust Metallurgique, Electrique et Industriel
Brussels, Belgium
. . hope is high, but problems continue to vex

HOWARD KNOX WARNER
Professor of Metallurgy, University of Melbourne
Melbourne, Australia
. . coal is the serious bottleneck "down under"

METALLURGY?

weldments, there is complete confusion: George Rappini of Ansaldo, for his own information, has spent a couple of years trying to correlate steel analyses and properties between French, German, Belgian, British and Italian steel sources, resulting in a maze of data that almost defies interpretation. He is plugging hard for the development of a single "nomenclature" for carbon and alloy steels, for mechanical tests and the type of test specimen to be used.

How to Organize?—In this work, as well as in the organization of training methods for professional engineers and metallurgists, there has been the untiring effort of Prof. Antonio Scortecci of the University of Genoa. He has been a guiding force in the founding of the Instituto Siderurgico which in the past two years has greatly accelerated its program of training and placing metallurgical engineers, and of gathering, analyzing and distributing results of metals research. Scortecci is an Italian conferee to WMC and he told STEEL that he is in this country primarily to learn the best methods for organizing metallurgical research and the appropriations which various companies make for research in proportion to their business volume.

His work has been difficult, he notes, but he feels strongly that an "international" clarification of metallurgical technology should be worked out between technical societies and institutes of the U. S. and Europe.

Eager to Inspect Mass Production—In general, the metals production and fabrication industries of Europe are small by contrast to this country. They are more of the job shop type, with many different products being processed on the same equipment by retooling or readjusting. Naturally, plant operators there all

IN SUMMARIZING collective opinions of 200 metallurgists, engineers, managers, technical directors, educators and administrators of the metals industries from 21 nations of the world, a vastly complex assortment of ideas must be blended. Out of them comes hope for strengthened industrial techniques throughout the free nations, tempered by the realization that problems everywhere are enormous and the reliance being placed on American methods, equipment and management for help is almost universal. "Conferees" to the forthcoming World Metallurgical Congress in Detroit began arriving in New York in mid-September, spending a few days there preparatory to splitting up into eight "teams" and embarking on study tours of principal industrial centers, all terminating in Detroit in time for the opening gun of the Congress late this week.

Interviews with a representative cross section of the conferees, revealed to STEEL's editors some of the thinking, the prejudices, the desires, the confusions occupying the attentions of leading metals specialists in widely scattered sections of the world. The effort is made here to present them in a sort of symposium, avoiding direct quotations which linguistic difficulties might make embarrassing. The experts pictured on these pages were among the principals contributing to the discussions.

Austria, Australia, Belgium, Brazil, Denmark, Finland, France, Germany, Greece, Holland, India, Italy, Japan, Luxemburg, Norway, New Zealand, Portugal, Sweden, Switzerland, Turkey and the United Kingdom were the countries represented. Arrangements were handled by an enlarged staff of the American Society for Metals, with the active assistance of the Department of State and the Economic Co-operation Administration. The ECA participated by making a substantial grant of funds under Technical Assistance Project No. 80, the largest of its kind ever attempted.

Mechanics of receiving the conferees, assigning them to hotel rooms, assembling them into their respective groups, arranging for currency conversion and other incidentals to handling a large group, many of whom had never visited the U.S. before, called for some exceptionally thorough staff work.

BENGT KJERRMAN
Research Director, Svenska Kullagerfabriken (S.K.F.) Gothenburg, Sweden

. . . induction hardening carbon steels to conserve alloys

GEORGE RAPPINI
Ansaldo SA Engineering Shops, Genoa, Italy

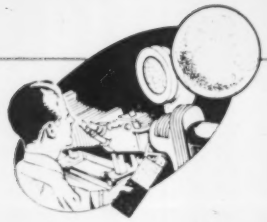
. . . one ship has to pass 14 different sets of welding tests

HANS REICHERT
Liesing Boscham & Co. Wein, Austria

. . . an oversupply of university trained engineers in Austria

THORSTEIN KAVLI
A/S Stavanger Tinfabrik Stavanger, Norway

. . . plants are small, standardization of nomenclature needed



ANTONIO SCORTECCI
Instituto Siderurgico Finsider
Genoa, Italy

. . . set up an international association of metallurgical societies

PAUL RIEBENSAHM
Professor, Technical University,
Berlin-Charlottenburg, Germany

. . . machine-building industry wants to "work also with plants of U.S.A."

have been told the story of mass production and the continuous moving assembly line so characteristic of this country. They were all anxiously waiting to see these assembly lines in the flesh, to note what phases of this type of operation might be adapted to their own needs in the interests of reducing costs and manual effort. At the same time, they feel that U. S. plants, particularly the smaller ones, may possibly be able to benefit from European experience with trying to make money on "batch-type" operations.

As one British steel research expert put it, many Europeans know second-hand of American accomplishments in low-cost mass production, but must appreciate that these techniques cannot literally be copied and transferred to Europe. The foreign conferees must learn not only what the advantages of repetitive production are, but also the "snags" to be avoided.

Band Together on Research—One encouraging aspect is the definite reawakening of co-operative research programs among western European nations. Thus, France, England, Sweden, Holland and Belgium are sending teams of metallurgists to study various phases of flame radiation in the open hearth. The work is supervised by a joint committee of two from each country. Small model furnaces have been constructed and each team tackles one part of the overall program. A similar study on the low-shell blast furnace, supplied with an enriched blast, is being undertaken by representatives from Greece, England and Belgium, the first experimental unit going up at Liege, Belgium.

Interchange, or perhaps more exactly cross-fertilization, of ideas is coming to be recognized as vital to progress of Europe's metal industries, both ferrous and nonferrous. The question is how far to go; how far can one country properly go in disclosing research and development work it has pioneered to another? That there is this reservation becomes apparent after conversations with many of the foreign visitors. It is inescapable that the World Metallurgical Congress will be principally a one-way street, with most of the ideas flowing from U. S. technicians to their counterparts abroad. On the other hand, the simple fact of meeting face to face with leading engineering and scientific personalities from allied nations could have values for Americans. It helps to understand their viewpoints, to hear why they expect so much from this country, to learn the odds against which many of them seek to work. Officially, of course, politics is off-limits as a topic of discussion, but it takes no shrewd observer to see how politics influences their opinions.

Schooling New Talent—Training of young metallurgists and engineers, both at the university and plant levels, is a subject high in interest throughout the world. Particularly in Britain is there a serious shortage of young trained men. Many plants there are now furloughing their young employees for one or two days a week, with pay, so that they may attend college. National colleges are being established—the National Foundry College is one example—to provide semitrained men with two years of intensive postgraduate instruction in their respective fields. The Ministry of Education is joining with interested manufacturing plants in setting up such programs.

Representatives of the British delegation to WMC, including Alan Leckie and John Pearson of the British Iron & Steel Research Association; Kenneth Barraclough of the Brown-Firth Research Laboratory in Sheffield; and Reginald W. Blount of the Ministry of Education were most emphatic on the importance of training activity and made it plain that they were seeking all possible information on co-operative education techniques. One reason why metallurgical training has been rather slow is the indifference of young men to become active in the field. This is perhaps explained by the fact that metallurgy has not been recognized as a profession in Britain. To correct this situation the Institution of Metallurgists has been organized and a strong membership of qualified professional metallurgical engineers is being recruited.

Different Attitude on Research—The British philosophy on research in the metals industries differs from that of the U. S. in that new developments are moved painstakingly through laboratory and pilot stages before being accepted for production. In this country the pressure is for immediate production, with laboratory and experimental work either concluded as quickly as possible or deferred until after a start has been made on production. At least, that is the British viewpoint, and it may be one reason why there has not been more "sponsored" research in Britain of the type done here by Battelle, Mellon and Armour institutes. Further, it may explain why acceptance of boron steels as a means of alloy conservation has been slower in Britain. Metallurgists there are inclined to the view that steels with only residual amounts of alloys can replace higher alloy materials, but they find users slow to be convinced.

A top subject in British steelmaking circles cur-

REGINALD W. BLOUNT
Inspector, Ministry of Education
Derby, England

. . . taking steps to train more young metallurgists

KENNETH BARRACLOUGH
Brown-Firth Research Laboratory
Sheffield, England

. . . what about nitrogen to replace nickel in alloy steels?

JOHN PEARSON
British Iron & Steel Research Association
London, England

. . . co-operate on low-shaft blast furnace research

JAMES PEARCE
British Cast Iron Research Association
Birmingham, England

. . . should not duplication of scientific effort be recognized as good?

PAUL BRENNER
Research Laboratory, Vereinigte Reichmetall Werke
Bonn/Rhein, Germany

. . . continuous casting of aluminum and copper billets

TUKASA KAWAMURA
Nikko Copper Works
Furukawa Electric Co., Tochigi Ken, Japan

. . . costs too high for exporting aluminum products

WILLIAM REES
Senior Principal Scientific Officer
National Physical Laboratory
Middlesex, England

. . . residual amounts of critical alloys are sufficient

EDWARD FEHLBAUM
OEEC Administrator, Secretary ECA PROJECT 80
Paris, France

. . . attention to production ideas workable in Europe

rently is the reclamation of sulphuric acid from waste pickle liquors and a pilot plant is now going up for production on the basis of one ton of sulphur dioxide a day. Cost estimates, based on the assumption that no cost is involved in the iron sulphate to be processed, indicate that acid can be made at a figure equivalent to new acid on a scale of 10,000 tons a year.

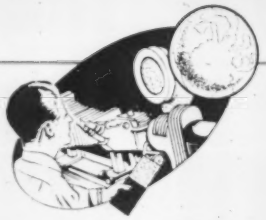
Effects of nitrogen in alloy steel as a means of replacing one or two per cent of critical nickel are being studied actively by British metallurgists, Mr. Barraclough of Brown-Firth for one expressing considerable interest in knowing more about nitrogen. He also was concerned about the change from 18-8 stainless steel to the straight-chromium type in order to conserve nickel. This program has gone considerably further in the U. S. than in Britain, numerous problems in melting and rolling being encountered.

More Induction Hardening—On the subject of alloy conservation, considerable extension of induction hardening of carbon steels to replace full-hardened alloy steels was foreseen. Bengt Kjerrman of S.K.F. in Sweden touched on this trend. He also saw the need for a better interpretation and correlation of metallurgical test data in connection with alloy steels. He wondered whether or not too much reliance was being placed on Magnaflux inspection results. In other words, the rejection of an expensive part because of indicated discontinuities from Magnaflux tests may not be entirely warranted, if the discontinuity is nothing more than a small slag inclusion.

Danes Have Troubles — Shortages of competent managers and raw materials, too little competition, and the difficulty of persuading labor to make full use of modern machinery are some of the troubles besetting industry in the small nation of Denmark. The country has only 4,000,000 population, of which 25 per cent are gainfully employed. The economy there breaks down into 25 per cent agricultural, 30 per cent industrial, 16 per cent trade and business, 12 per cent handicraft, 7 per cent transport and 10 per cent administrative. The iron and metals industries account for 30 per cent of all industry.

One of the larger industrial plants is Northern Cable & Wire Works at Copenhagen, of which Kaj Arn is manager. He reviewed briefly some of his firm's activity in production of copper, aluminum and brass sheets, tubes and shapes; iron nails, chain and horseshoes. All ingot material has to be imported and the supply falls short of demand.

Northern Cable is furnishing a new type of high-voltage oil-filled submarine cable, the first installation of which was made this summer between Sweden and Denmark for transmitting power at 132,000 volts. The cable is of the flat type, with three conductors side by side. Resilient supporting bands are of corrugated bronze tapes to (*Please turn to Page* 172)



WHO HAS THE

Self-sufficiency is myth. All industrial nations must import many of the metals they need. United States and Russia hold edge over other contenders for power in volume and diversity of mineral resources

NO NATION in the world is self sufficient in metals.

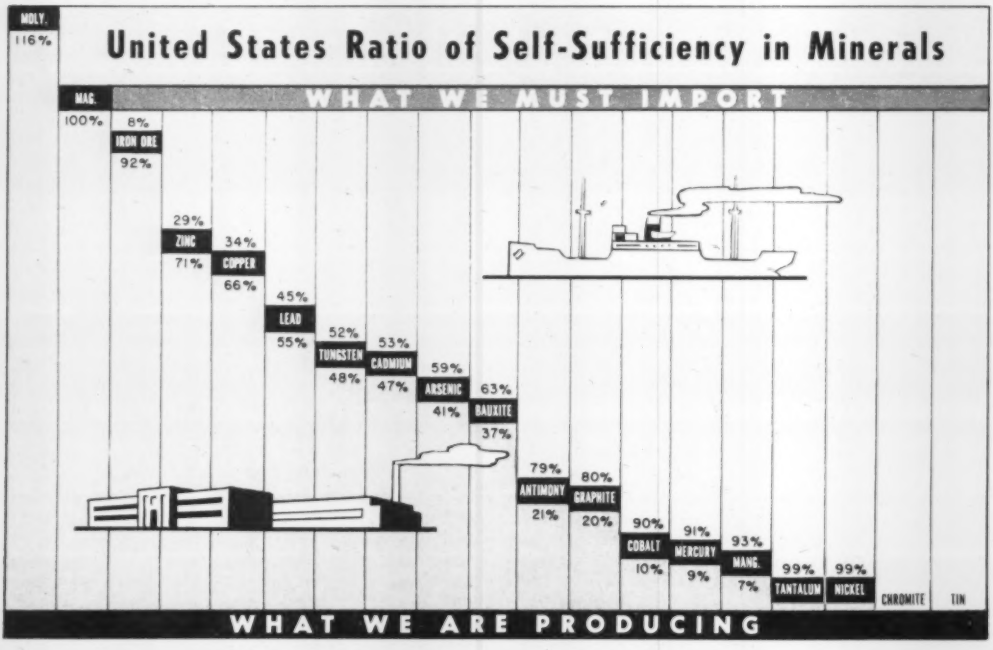
Only two countries, the United States and Russia, have sufficient of the basic minerals within their borders or spheres of influence to expand and develop their economies in keeping with their land areas, populations and positions of assumed influence. They likely will be rivals for generations, barring war that would destroy one or the other.

These two facts become apparent through study of the world's metals and minerals. By accident of nature, some countries are more richly endowed with metal resources than others, but all countries depend on imports for a large portion of the metals they need. The rival positions of the United States and Russia result not only from the richness and diversity of their mineral resources but because of all the contenders for power, they are the only two built on continental proportions.

U. S. Has Edge—The United States holds vast advantages over Russia. Its development is many years ahead of that of the USSR. Our steelmaking capacity, a good index of industrial might, is three times that of Russia. Our sphere of influence is greater, and we have access to friendly neighbors who can supply us with most of the raw materials we must import. Within our borders, known resources in metals are greater than the known resources of Russia.

Now Have Less—But guard against any feeling of complacency. Two World Wars and now a vast armament program have taken their toll of this nation's mineral resources. A generation ago, we began to draw increasingly upon foreign sources for many strategic and critical materials. During the unparalleled activity of the past ten years, we have so accelerated our consumption of iron ore, copper, lead, zinc and other metals that the United States is a have-less nation.

Take a look at the self-sufficiency chart below.



WORLD'S METALS

The chart, based on Bureau of Mines estimates for 1951, shows we are self-sufficient in only two of the metals listed—molybdenum and magnesium. Percentagewise, we depend on other countries for approximately half the meals we consume. Many of those in which we are most deficient must come half way across the world.

We Look Abroad—Until some time between the wars we were self-sufficient in copper, lead and zinc. We were exporters of those metals. Now we must import from a third to a half of our requirements. The change is due not only to the depletion of domestic resources but also to the tremendous expansion in consumption. Fortunately, most of our imports of copper, lead, and zinc come from the Western Hemisphere.

Who Has the Metals?—Tables on the following pages show the world production of 18 important metals for 1950.

The United States is the leading producer of iron ore, copper, aluminum, lead, zinc, magnesium, molybdenum and cadmium. It is second in the production of tungsten.

Russia is the leading producer of manganese and chromite and is second in iron ore, nickel and magnesium.

Canada is by far the largest producer of nickel and rates second in zinc and aluminum. Mexico and South American countries produce important quantities of copper, zinc, lead, molybdenum, cadmium and antimony. Bolivia produces tin.

Other essential meals are most abundant in Africa and Asia. Malaya is No. 1 in tin and tantalite. The Belgium Congo, Nigeria, Rhodesia, and Gold Coast and other African countries hold important reserves of cobalt, columbite, vanadium, manganese and chrome. China is the leading producer of tungsten.

No country on the list has all the elements necessary to produce all the metals required in today's economy—either for peace or for war.

West Holds Advantage—The tables show that the Western Hemisphere is well fixed in iron ore, copper, lead, zinc, aluminum, magnesium, nickel, molybdenum and cadmium.

But the accident of nature was not so kind to this side of the world in manganese, chromite, columbite, tantalite, tin, tungsten and antimony.

Free World vs. Commies—If we compare the metal production of the countries of the free world with those under Russia's influence (see chart at right), the superiority of the free world is apparent. This picture, of course, could change rapidly and substantially in the event of war launched by Russia. That country then probably could seize the resources and productive capacities of some countries of the now-free world.

U. S. Largest Consumer—The United States with roughly 6 per cent of the world's land area and 6 per cent of the world's population consumes more than 50 per cent of the world's metals. For many years, the supply of meals caused little concern. We drew from our large resources and could readily import those which we needed but did not have within our borders.

Now the situation has changed. We are increas-

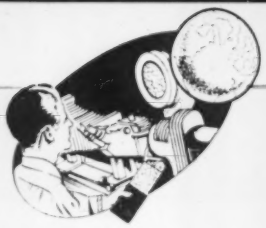
FREE NATIONS

BOX SCORE OF WORLD METAL PRODUCTION (1950)

COMMUNIST NATIONS

(Net Tons Unless Otherwise Specified)

FREE NATIONS		COMMUNIST NATIONS
203,000,000 (Gross Tons)	IRON ORE	37,000,000 (Gross Tons)
1,391,000	ALUMINUM	240,000
2,510,000	COPPER	245,000
2,048,000	ZINC	150,000
1,571,000	LEAD	131,000
36,805	MAGNESIUM	7,275
132,276	NICKEL	27,558
1,949,000	CHROMITE	560,000
18,370	TUNGSTEN	12,220
162,400 (Gross Tons)	TIN	12,000 (Gross Tons)
3,730,000	MANGANESE	2,322,500
15,430	MOLYBDENUM	664
47,400	ANTIMONY	7,717
12,313,000 (Pounds)	CADMIUM	165,000 (Pounds)



ingly dependent on imports. And some of our former sources of supply have been cut off.

Today, the most puzzling problem throughout the metalworking industry, and in the defense planning offices in Washington, is metals shortages. The supply of most of the important tonnage metals is less than the demand. And many of the strategic metals are causing grave concern.

The National Production Authority lists the following in "very short supply": Aluminum, copper, lead, magnesium, titanium, tin, zinc, cobalt, molybdenum, nickel, tatalum, columbium, tungsten, selenium, platinum, iridium, and osmium.

Data on world mine production of metals were obtained from various sources, including: Bureau of Mines; American Bureau of Metal Statistics; British Iron & Steel Federation; Economic Cooperation Administration; U. S. Department of Commerce; International Tin Study Group; the Metal Bulletin, London; and STEEL's correspondents abroad. Some figures, particularly for Russia and its satellites, are estimated on the basis of best available information. World totals estimated to include production in countries for which statistics are not available.

1950 WORLD MINE

IRON ORE

Gross Tons

United States	98,041,094
Russia	34,447,350
France	29,726,094
Sweden	13,707,092
United Kingdom	12,937,440
Germany	10,710,173
Luxemburg	3,784,287
Canada	3,256,750
India	2,952,630
Chile	2,929,008
Algeria	2,532,372
Australia	2,365,056
Spain	2,046,172
Brazil	1,869,999
Austria	1,829,646
Czechoslovakia	1,574,736
Union of S. Africa	1,170,225
Sierra Leone	1,166,288
Japan	895,631
Spanish Morocco	846,420
Yugoslavia	787,368
Poland	777,525
Tunisia	746,031
Philippines	589,541
Malaya	498,994
Italy	435,020
Norway	423,210
Mexico	413,368
Rumania	388,762
Hungary	362,189
French Morocco	313,962
China	246,052
Turkey	230,305
Venezuela	186,999
Hong Kong	166,331
Portuguese India	128,931
Southern Rhodesia	56,099
Switzerland	54,131
Belgium	45,273
Greece	40,352
New Caledonia	14,763
Cuba	11,810
World Total	240,000,000

LEAD

Net Tons

United States	429,875
Mexico	247,069
Australia	231,971
Canada	169,888
Russia	123,000
Peru	67,251
French Morocco	53,136
Germany	49,533
Italy	42,230
Spain	41,753
Bolivia	34,396
South West Africa	29,802
Sweden	25,975
Argentina	25,400
Tunisia	21,240
Rhodesia	15,355
France	12,115
Japan	11,963
Czechoslovakia	6,000
Austria	4,894
United Kingdom	3,381
Greece	2,543
Fr. Equatorial Africa	2,000
Algeria	1,560
China	1,200
India	701
Hungary	400
World Total	1,702,000

NICKEL

Net Tons

Canada	123,057
Russia	27,557
New Caledonia	6,944
Union of S. Africa	929
United States	912
World Total	159,834

VANADIUM

Net Tons

Peru	480
South West Africa	325
United States	n.a.*
Northern Rhodesia	176

*Not available for security reasons.

TIN

(Gross Tons)

Malaya	57,537
Indonesia	32,099
Bolivia	31,213
Belgian Congo	13,700
Thailand	10,364
Nigeria	8,258
Russia	8,000
China	3,600
Australia	2,472
Burma	1,682
United Kingdom	960
Union of S. Africa	720
Portugal	690
Spain	575
Canada	355
Japan	326
Argentina	300
Mexico	290
Brazil	240
Uganda	198
Tangonyika	121
Germany	120
South West Africa	100
United States	94
France	83
Peru	72
French Cameroon	67
Southern Rhodesia	65
Indochina	62
Swaziland	37
Northern Rhodesia	4
World Total	174,400

In Group II on the critical list (in approximate balance) are antimony, bismuth, cadmium, germanium, tellurium, chromium, manganese, silicon and vanadium. Considering the strategic position of many of the latter metals, we may have future trouble in maintaining our supply of them.

Group III metals (in good supply) are mercury, gold, palladium, rhodium, silver, boron, calcium, ferrotitanium and zirconium.

Iron and steel products fall in all three groups, but the overall supply is short.

What's the Answer?—The solution to our national metals shortage may be found in the following actions, all of which are receiving attention in steel mills, metallurgical laboratories and manufacturing plants, in mines and in the defense offices:

1. Find and develop new domestic sources.
2. Develop new sources in friendly, accessible countries.
3. Stretch available supplies.
4. Search for practical substitutes.

New Sources—Metals come from mines, which have to be discovered. They require facilities which cannot be expanded as fast as can a manufacturing plant. Often, the metal find is in a remote area and before it can be developed transportation must be

PRODUCTION OF METALS

COPPER

Net Tons

United States	915,500
Chile	399,867
Rhodesia	314,589
Canada	261,914
Russia	240,000
Belgian Congo	193,917
Mexico	65,266
Yugoslavia	44,100
Japan	43,345
Union of S. Africa	36,848
Cyprus	31,884
Peru	30,702
Cuba	22,663
Finland	18,993
Sweden	17,746
Australia	17,540
Norway	16,975
Turkey	12,793
Philippines	11,446
South West Africa	10,678
Spain	7,498
India	7,408
Bolivia	5,185
Austria	1,808
Germany	1,500
China	1,400
Ecuador	580
Hungary	400
Italy	60
World Total	2,755,000

TANTALITE

Concentrates in Pounds

Malaya Union	17,920
Australia	14,996
South West Africa	12,570
Southern Rhodesia	1,700
United States	n.a.

COLUMBITE

Concentrates in Pounds

Nigeria	1,935,360
Belgian Congo	297,675
Mozambique	77,700
Uganda	11,200
United States	4,000
French East Africa	3,660

MANGANESE

Net Tons

Russia	2,204,620
Union of S. Africa	871,857
Gold Coast	784,200
India	748,648
French Morocco	316,655
Brazil	179,235
Egypt	167,737
Japan	147,782
United States	140,200
Cuba	86,975
Hungary	44,092
Mexico	35,714
China	33,069
Philippines	32,922
Chile	27,031
Rumania	24,250
Portuguese India	22,204
Turkey	22,046
Spain	18,739
Belgian Congo	18,728
Italy	17,866
Korea	16,534
Australia	16,191
Angola	10,260
New Caledonia	2,030
Portugal	879
Spanish Morocco	826
Fiji	223
World Total	6,062,705

ZINC

Net Tons

United States	618,207
Canada	311,225
Mexico	201,095
Australia	186,284
Russia	141,900
Belgian Congo	84,119
Peru	81,364
Italy	78,166
Germany	76,389
Spain	69,897
Japan	57,355
Sweden	40,471
Rhodesia	25,442
Bolivia	21,572
Argentina	13,998
French Morocco	12,584
France	11,162
South West Africa	9,288
Algeria	7,866
Norway	7,606
Yugoslavia	5,000
Greece	3,510
Austria	3,274
Tunisia	3,232
Rumania	3,000
Fr. Equatorial Africa	685
World Total	2,198,000

MOLYBDENUM

Net Tons

United States	14,239
Chile	881
China	661
Norway	68
Canada	30
Australia	3
World Total	16,094

(Please turn to next page)

built to the site. In mining, you have to sink shafts and this work may have to await transportation. You cannot do development work at the bottom of the shaft until you have it down to where you want to go. Shaft sinking is necessarily slow. Then before the mine can be put into production, the workings from which the production is to come must be developed and the facilities needed to concentrate the ore built. In most cases the development of new sources for metals requires years.

If the new finds are in other countries, contracts for development of the finds must be negotiated. Any mining executive experienced in foreign development can testify such negotiations can be tough and time-consuming.

Conservation—How to stretch available supplies

(*Please turn to Page* 143)

1950 WORLD MINE PRODUCTION OF METALS—*continued*

CHROMITE

Net Tons

Russia	551,155
Union of S. Africa	547,102
Turkey	385,808
Southern Rhodesia	321,350
Philippines	276,140
Cuba	129,364
Yugoslavia	110,231
Japan	35,222
Pakistan	19,841
Greece	13,923
Bulgaria	8,818
United States	425
Guatemala	330
World Total	2,509,959

CADMIUM

Pounds

United States	9,304,061
South West Africa	1,731,400
Mexico	1,515,800
Canada	832,464
Australia	632,726
United Kingdom	261,331
Japan	198,765
Russia	165,000
Italy	92,400
Belgian Congo	79,200
World Total	12,478,400

MAGNESIUM

Net Tons

United States	15,725
Russia	6,613
United Kingdom	5,401
Canada	1,770
China	661
France	330
World Total	44,080

TUNGSTEN

Concentrates containing 60 per cent WO_3
Net Tons

China	12,125
United States	4,853
Portugal	2,755
Bolivia	2,712
Russia	1,653
Thailand	942
Spain	898
Brazil	771
Burma	661
Australia	491
France	440
South Korea	440
Peru	429
Sweden	399
Uganda	239
Belgian Congo	180
Union of S. Africa	105
Mexico	73
Japan	70
Southern Rhodesia	70
United Kingdom	67
Malaya	29
Finland	22
Tanganyika	16
French Morocco	7
Nigeria	5
South West Africa	4
Italy	2
World Total	30,590

COBALT

Net Tons

Belgian Congo	5,674
Northern Rhodesia	738
French Morocco	429
United States	329
Canada	313
Australia	11
World Total	7,826

ANTIMONY

Net Tons

Bolivia	9,570
Union of S. Africa	9,149
Mexico	6,468
China	3,747
United States	2,496
Czechoslovakia	2,204
Turkey	1,763
Hungary	1,708
Greece	1,658
Algeria	1,598
French Morocco	738
Austria	450
Italy	440
Spain	440
France	363
Canada	325
Australia	244
Japan	177
Thailand	110
Russia	55
Southern Rhodesia	26
World Total	55,115

ALUMINUM

Net Tons

United States	718,617
Canada	394,626
Russia	209,438
France	67,240
Norway	51,391
Italy	40,862
United Kingdom	33,004
Switzerland	23,148
China	19,841
Austria	19,828
Hungary	6,613
Sweden	4,409
India	4,023
Korea	3,306
Yugoslavia	2,755
Spain	2,388
World Production	1,631,000

American Society for Metals

PROGRAM

All Sessions at Hotel Statler

METALLURGISTS and metal production executives representing 29 free nations will converge on Detroit next week for the first World Metallurgical Congress and the 33rd National Metal Congress and Exposition. During the five days from Oct. 15-19, they will visit the show at Michigan State Fair Grounds and attend technical sessions sponsored by the American Society for Metals; American Welding Society; Metals Branch, American Institute of Mining and Metallurgical Engineers and Society for Non-Destructive Testing.

The exposition this year is housed in seven separate buildings and occupies about 6½ acres of floor space. 400 metalworking firms are exhibiting.

1951-52 National officers of the participating technical societies are: American Society for Metals: President, John Chipman, head, Dept. of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.; vice president, Ralph L. Wilson, director of metallurgy, Steel & Tube Division, Timken Roller Bearing Co., Canton, O.; treasurer, Ralph L. Dowdell, head, Department of Metallurgy, University of Minnesota, Minneapolis, secretary, W. H.. Eisenman, ASM Headquarters, Cleveland.

American Welding Society: President, C. H. Jennings, Westinghouse Electric Corp., Buffalo; first vice president, F. L. Plummer, Hammond Iron Works, Warren, Pa.; secretary, J. G. MacGrath, AWS Headquarters, New York.

American Institute of Mining & Metallurgical Engineers: Nominated for 1952: President, Michael Lawrence Haider, vice president, Imperial Oil Ltd., Toronto, Canada; secretary, E. H. Robie, AIMME Headquarters, New York; chairman, Institute of Metals Branch, Walter A. Dean, works chief metallurgist (Cleveland) Aluminum Co. of America; secretary, Institute of Metals Branch, Ernest O. Kirkendall, AIMME Headquarters, New York.

Society for Non-Destructive Testing: President, W. E. Thomas, vice president in charge of sales and field engineering, Magnaflux Corp., Chicago; secretary, Philip D. Johnson, National Headquarters, Evanston, Ill.

American Society for Metals

Seminar on Metal Interfaces

Sessions at Hotel Statler

Saturday Morning, Oct. 13
Theoretical Considerations

Atomistic Theory of Metallic Surfaces, by Conyers Herring, Bell Telephone Laboratories.

Theory of Internal Boundaries, by Harvey Brooks, Cruft Laboratory, Harvard University.

Grain Shapes and Other Metallurgical Applications of Topology, by Cyril Stanley Smith, director, Institute for the Study of Metals, University of Chicago.

Saturday Afternoon, Oct. 13
Interfacial Energies

Measurement of Solid: Liquid and Solid: Gas Interfacial Energies, by Harry Udin, Department of Metallurgy, Massachusetts Institute of Technology.

Measurement of Solid: Solid Interfacial Energies, by James B. Hess, Kaiser Aluminum and Chemical Corp.

Energies and Structure of Grain Boundaries, by Karl T. Aust, Kaiser Aluminum and Chemical Corp. and Bruce Chalmers, University of Toronto.

Sunday Morning, Oct. 14
Movements of Interfaces

Kinetics of Recrystallization, by David Harker, director, protein structure project, Brooklyn Polytechnic Institute.

Interfacial Movements During Recrystallization, by Paul A. Beck, chairman, Department of Metallurgy, University of Notre Dame.

Interfacial Movements During Grain Growth, by Robert L. Fullman, Research Laboratory, General Electric Co.

Relative Interfacial Movements, by Arthur S. Nowick, Department of Metallurgy, Yale University.

Sunday Afternoon, Oct. 14
Effects of Interfaces

Phase Transformations at Interfaces, by Alfred H. Geisler, Research Laboratory, General Electric Co.

Mechanical Property Effects of Interfaces, by Bruce Chalmers, Department of Metallurgical Engineering, University of Toronto.

Phenomena at Surfaces, by Herbert H. Uhlig, Department of Metallurgy, Massachusetts Institute of Technology.

World Metal Resources
Opening Session of World Metallurgical Congress
Sunday, Oct. 14, 8:00 p.m.
Ballroom, Hotel Statler

Presiding: Zay Jeffries, Director-General, World Metallurgical Congress

Raw Materials for the Metal Industry, by James Boyd, formerly administrator of defense minerals, U. S. Department of Interior, Kennecott Copper Corp.

Defense Metal Conservation and Substitution, by K. P. Harten, executive secretary Vereins Deutscher Eisenhuttenleute (German Iron and Steel Institute.)

Metals for Defense in ECA Countries. Speaker to be announced.

Metals for Defense in Non-ECA Countries of the Free World, by Clyde Williams, director, Battelle Memorial Institute, Columbus, O.

World Metallurgical Congress Sessions
Monday, Oct. 15, 9:30 a.m.
Constitution Diagrams Session

Constitution and Properties of Cobalt-Iron-Vanadium Alloys, by D. L. Martin and A. H. Geisler, General

JOHN CHIPMAN
President, American Society for Metals, 1951-52

RALPH L. WILSON
Vice-President, American Society for Metals, 1951-52

RALPH L. DOWDELL
Treasurer, American Society for Metals, 1951-52

GWILYM A. PRICE
Recipient, ASM Medal for Advancement of Research

DR. ROBERT F. MEHL
Recipient, ASM Albert Sauveur Achievement Award

DR. PAUL MERICA
Recipient, ASM Gold Medal

Electric Research Laboratories, Schenectady, N. Y.

Phase Relationships in the Iron-Chromium-Vanadium System, by Howard Martens, research engineer, and Pol Duwez, associate professor of mechanical engineering and chief, materials section, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, Calif.

A Partial Titanium-Chromium Phase Diagram and the Crystal Structure of $TiCr_2$, by Pol Duwez, associate professor of mechanical engineering and chief, materials section, and Jack L. Taylor, research engineer, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, Calif.

Titanium-Silicon System, by M. Hansen, supervisor, and H. D. Kessler and D. J. McPherson, research metallurgists, nonferrous metals research, Armour Research Foundation, Chicago.

Indium-Antimony System, by T. S. Liu, teaching fellow, and E. A. Peretti, professor of metallurgy, University of Notre Dame, Notre Dame, Ind.

Monday, Oct. 15, 9:30 a.m.
Melting and Refining Session

A Proposed Steel Making Process, by A. Reggiore, Milan, Italy.

A New Process for Direct Reduction of Iron Pyrites, by A. Scortecci, Genoa, Italy.

A Rapid Analytical Method for Hydrogen in Steel, by Y. Ishihara and S. Sawa, Kamakura, Japan.

Basic Bessemer Steel With Low Nitrogen and Phosphorus, by P. Coheur, Liege, Belgium.

Phosphorus Deoxidation of Molten Copper, by W. A. Baker, Surry, England.

Monday, Oct. 15, 2:00 p.m.
Diffusion Session

Interstitial Diffusion, by A. G. Guy, associate professor of mechanical engineering, University of North Carolina, Raleigh, N. C.

Carbonitriding of Carbon and Alloy Steels, by H. C. Fiedler, M. B. Bever and C. F. Floe, Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Chromium Diffusivity in Alpha Cobalt Chromium Solid Solutions, by John W. Weeton, research metallurgist, Lewis Flight Propulsion Laboratory, National Advisory Committee for Aeronautics, Cleveland.

Anisothermal Diffusion of Carbon in Austenite, by J. E. Black, Captain, Ordnance Department, U. S. Army, Detroit Arsenal, Detroit, and G. E. Doan, professor and head, Department of Metallurgical Engineering, Lehigh University, Bethlehem, Pa.

Tuesday, Oct. 16, 9:30 a.m.
High Temperature Alloys Session

Formation of Sigma Phase in 13 to 16% Chromium Steels, by H. S. Link and P. V. Marshall, U. S. Steel Co., Research & Development Laboratory, Pittsburgh.

Electrolytic Etching—The Sigma Phase Steels, by John J. Gilman, Crucible Steel Co. of America, Research Laboratory, Harrison, N. J.

Phase Changes Associated With Sigma Formation in 18-8-3-1 Chromium-Nickel-Molybdenum-Titanium Steel, by K. W. Bowen and T. P. Hoar, Cambridge, England.

Composition Limits of Sigma Formation in Nickel-Chromium Steels at 1200° F (650° C), by M. E. Nicholson, assistant professor, The Institute for the Study of Metals, University of Chicago, Chicago, C. H. Samans, associate director, Materials Division, Standard Oil Co. (Indiana), Chicago, and F. J. Shortsleeve, research assistant, Case Institute of Technology, Cleveland.

Ferrite Formation Associated with Carbide Precepitation in 18-Cr-8-Ni Austenitic Stainless Steel, by E. J. Dulis and G. V. Smith, research laboratory, U. S. Steel Co., Kearny, N. J.

Tuesday, Oct. 16, 9:30 a.m.
Mechanical Metallurgy Session

Determination of Flow Stress From a Tensile Specimen, by E. R. Marshall, instructor of metallurgy, and M. C. Shaw, associate professor of mechanical engineering, Massachusetts Institute of Technology, Cambridge, Mass.

Plastic Deformation of Zinc Bicrystals, by T. Kawada, Tokyo, Japan.

Mechanical Properties of Iron and Some Iron Alloys of High Purity, by W. P. Rees, Middlesex, England.

Crystal Orientation in Cold-Rolled Silicon Steel Sheet, by I. Gokyu and H. Abe, Tokyo, Japan.

Delayed Yield in Annealed Steels of Very Low Carbon and Nitrogen Content, by D. S. Wood, assistant professor, and D. S. Clark, associate professor, Department of Mechanical Engineering, California Institute of Technology, Pasadena, Calif.

Tuesday, Oct. 16, 2:00 p.m.
High Temperature Alloys Session

Cast Heat Resistant Alloys of the 21% Chromium-9% Nickel Type, by Howard S. Avery, research metallurgist, Charles R. Wilks, metallurgist, and John A. Fellows, research metallurgist, American Brake Shoe Co., Mahwah, N. J.

Influence of Extended Time on Creep and Rupture Strength of 16-25-6 Alloy, by C. L. Clark and M. Fleischmann, metallurgical engineers, Steel & Tube Division, Timken Roller Bearing Co., Canton, O., and J. W. Freeman, research engineer, Engineering Research Institute, University of Michigan, Ann Arbor, Mich.

Isothermal Transformation, Hardening and Tempering of 12% Chromium Steel, by R. L. Rickett, Research Laboratory, U. S. Steel Co., Kearny, N. J., W. F. White, U. S. Steel Co., Pittsburgh, C. S. Walton, U. S. Steel Co., Pittsburgh, and J. C. Butler, South Works, U. S. Steel Co., S. Chicago, Ill.

Cladding of Molybdenum for Service in Air at Elevated Temperature, by W. L. Bruckart, research engineer, and R. I. Jaffee, supervisor in nonferrous physical metallurgy, Battelle Memorial Institute, Columbus, O.

Wednesday, Oct. 17, 9:30 a.m.
ASM Annual Meeting

Edward DeMille Campbell Memorial Lecture

Wednesday, Oct. 17, 2:00 p.m.
Embrittlement Session

Effects of Decomposition of Retained Austenite During Tempering on Notch Toughness and Tensile Properties, by E. F. Bailey and W. J. Harris, Jr., members of ferrous alloys branch, Naval Research Laboratory, Washington.

Comparison of the Effects of Alloying Elements on the Lower and Upper Transition Temperatures in Pearlitic Steel, by J. A. Rinebolt and W. J. Harris, Jr., Ferrous Alloys Branch, Naval Research Laboratory, Washington.

Effect of Retained Austenite Upon Mechanical Properties, by L. S. Castleman, Atomic Power Division, Westinghouse Electric Corp., Pittsburgh, B. L. Averbach, assistant professor of physical metallurgy, and Morris Cohen, professor of physical metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Some X-Ray Diffraction and Electron-Microscope Observations on Temper-Brittle Steels, by S. R. Maloof, research metallurgist, Springfield Armory, Springfield, Mass.

Thursday, Oct. 18, 9:30 a.m.
Mechanical Metallurgy Session

Strain Aging Effects, by J. D. Lubahn, Metallurgy and Ceramics Divisions, General Electric Co., Research Laboratory, Schenectady, N. Y.

Fatigue Strength of Large, Notched Steel Bars Surface Hardened by Gas Heating and Induction Heating, by S. L. Case, J. M. Berry and H. J. Grover, Battelle Memorial Institute, Columbus, O.

Deep Drawing Limits for Rectangular Boxes, by T. Ishikawa, Osaka, Japan.

Elimination of Yield Point Phenomena by Temper Rolling and Roller Leveling, by N. H. Polakowski, Swansea, England.

Effect of High Heating Rate on the Tensile Properties of Metals, by W. K. Smith, metallurgist, C. C. Woolsey, metallurgist, and W. O. Wetmore, head, metallurgy branch, U. S. Naval Ordnance Test Station, China Lake, Calif.

Thursday, Oct. 18, 9:30 a.m.
High Temperature Phases Session

An Interpretation of the Hysteresis Loops in A_2 and A_3 Transformations of Pure Iron, by K. Honda and M. Sato, Tokyo, Japan.

Magnetic Property Changes in Iron Molybdenum Alloys During Aging, by T. Mishima, R. Hasiziti and Y. Kamura, Tokyo, Japan.

Age Hardening, by T. Mishima, Tokyo, Japan.

Carbide Reactions in High Temperature Alloys, by J. R. Lane, Naval Research Laboratory, Washington and N. J. Grant, associate professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Allotropy of Cobalt, by A. G. Metcalfe, Delford, Ont., Canada.

Thursday, Oct. 18, 2:00 p.m.
Heat Treatment Session

Stress-Induced Transformation of Retained Austenite in Hardened Steel, by B. L. Averbach, S. G. Lorris and Morris Cohen, Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

An Investigation of the Quenching Characteristics of a Salt Bath, by M. J. Sinnott, associate professor of chemical and metallurgical engineering, and J. C. Shyne, graduate student, Department of Metallurgical Engineering, University of Michigan, Ann Arbor, Mich.

Limitations of the End Quench Hardenability Test, by A. R. Troiano, professor of physical metallurgy, and L. J. Klinger, senior research associate, Case Institute of Technology, Cleveland.

A Correlation of End-Quenched Test Bars and Rounds in Terms of Hardness and Cooling Characteristics, by E. W. Weinman, research metallurgist, R. W. Thomson, assistant head, and A. L. Boegehold, head, Department of Metallurgy, General Motors Corp., Research Laboratories Division, Detroit.

Friday, Oct. 19, 9:30 a.m.
Physical Metallurgy Session

Particle Size Analysis of Metal Powders, by C. C. Gregg and Bernard Kopelman, Sylvania Electric Products Inc., Bayside, N. Y.

Interrelation of Mechanical Properties, Casting Size, and Microstructure of Ductile Cast Iron, by R. W. Kraft and R. A. Flinn, Metallurgy Department, American Brake Shoe Co., Mahwah, N. J.

Gas Evolution from Gray Cast Iron During Enameling, by L. F. Porter, research metallurgist, and P. C. Rosenthal, professor of metallurgy, Department of Mining and Metallurgy, University of Wisconsin, Madison, Wis.

Aluminum—6 Per Cent Magnesium Wrought Alloys for Elevated-Temperature Service, by K. Grube, research engineer, and L. W. Eastwood, supervisor, nonferrous metallurgy, Battelle Memorial Institute, Columbus, Ohio.

A Study of the Microhardness of the Major Carbides in Some High Speed Steels, by P. Leckie-Ewing, metallurgist, Union Twist Drill Co., Butterfield Division, Rock Island, Que., Canada.

American Society for Metals

Educational Lectures

All Sessions Hotel Statler

Two Lecture Courses

All Sessions in Building M, Fair Grounds

Residual Stress Measurements

Monday, Oct. 15—8:00 p.m.

Origin, Nature and Effects of Residual Stresses, by R. G. Treuting, Bell Telephone Laboratories, Murray Hill, N. J.

Measurements of Residual Stresses, by J. J. Lynch, Case Institute of Technology, Cleveland.

Tuesday, Oct. 16—8:00 p.m.

Residual Stress States Produced in Metals by Various Processes, by H. B. Wishart, U. S. Steel Co., Gary, Ind.

Relief and Redistribution of Residual Stresses in Metals, by D. G. Richards, United Aircraft Corp., East Hartford, Conn.

Principles of Heat Treatment

All Lectures by M. A. Grossmann, Director of Research U. S. Steel Co., Pittsburgh

Tuesday, Oct. 16—4:30 p.m.

1. Hardening. 2. Hardenability and Quenching.

Wednesday, Oct. 17—4:30 p.m.

3. Isothermal Diagrams and Martensite. 4. Tempering.

Wednesday, Oct. 17—8:00 p.m.

5. Grain Size. 6. Hardness, Strength and Toughness.

American Welding Society

PROGRAM

All Sessions at Book-Cadillac Hotel

Monday Morning, Oct. 15

Structural Welding

Yield Strength of Welded Continuous Beams, by C. H. Yang and L. S. Beedle, Fritz Engineering Laboratory, Lehigh University and H. G. Johnston, University of Michigan.

Column Strength Under Combined Bending and Thrust, by R. L. Ketter and L. S. Beedle, Fritz Engineering Laboratory, Lehigh University and B. G. Johnston, University of Michigan.

Estimating Weldments and Welded Structural Steel, by Chas. F. Frantz, Lehigh Structural Steel Co.

Surface Conditioning of Structural Steel by Welding, by R. E. Somers and H. C. VonBlohn, Bethlehem Steel Co.

Resistance Welding

Physical and Metallurgical Characteristics of Spot Welding Titanium, by M. L. Begeman, J. C. Fontana and Frank W. McBee, Jr., University of Texas.

Application of Spot and Seam-Welding to Design, by S. P. Jenkins and Thomas E. Piper, Northrop Aircraft Inc.

Spot and Projection Welding Using Magnetic Electrode Force, by William E. Klingeman and H. H. Kruer, Precision Welder and Machine Co.

A Case of Power, by Myron Zucker, Myron Zucker Engineering Co., Jerry Geralds, Midwest Wire Products Co., and Paul Duker, Detroit Edison Co.

Monday Afternoon, Oct. 15

Resistance Welding

Seam Welding Containers Automatically, by C. S. Seltzer, Swift Electric Welder Co.

Spot and Seam Welding of Nimonic and Similar Heat-Resistant Alloys, by J. Solomon, Sciaky Bros. Inc.

Temperature Distribution During the Flash Welding of Steel, by Ernest F. Nippes, W. F. Savage and J. J. McCarthy, Rensselaer Polytechnic Institute.

Weldability

Microcracks and the Low-Temperature Cooling Rate Embrittlement of Arc Welds in Mild Steel, by A. E. Flanigan, professor, Dept. of Engineering, University of California.

Effect of Sub-Critical Cooling Rate on Strain and Quench Aging of Structural Steels, by C. Felmley, C. Hartbower and W. S. Pellini, Metallurgy Division, Naval Research Laboratory.

Nonferrous

Tensile Tests and Metallurgical Studies of Welded Copper Joints, by R. J. Mosborg, R. W. Bohl, F. L. Howland and W. H. Munse, Department of Civil Engineering, University of Illinois.

Welding Iron-Bearing Alpha Aluminum Bronze, by F. Emergy Garriott, Ampco Metal Inc.

Pressure Welding Aluminum at Various Temperatures, by M. A. Miller and G. W. Oyler, Aluminum Research Laboratories.

Monday Evening, Oct. 15

President's Reception

Tuesday Morning, Oct. 16

Ship Structure

Work of the Ship Structure Committee, by R. Adm. K. K. Cowart, U. S. Coast Guard.

Low-Carbon Steel: Subcritical Heating vs. Transition Temperatures, by L. J. Klinger, E. B. Evaneskes and Wm. M. Baldwin, Case Institute of Technology.

Studies of Tests for Evaluating Welded Ship Steels, by C. B. Voldrich and P. J. Rieppel, Battelle Memorial Institute.

Stress Studies of Bulkhead Intersections for Welded Tankers, by W. R. Campbell and L. K. Irwin, National Bureau of Standards.

Influence of Composition and Steel-Making Practice Upon Ship-Plate Quality, by H. M. Banta, Battelle Memorial Institute.

Fundamental Studies of Arc Welding

Effect of Power Supply Characteristics on dc Welding, by Jack B. Keyte, Department of Welding Engineering, Ohio State University.

Welding Characteristics of Submerged Arc with Three-Phase Power, by E. A. Clapp, Union Carbide and Carbon Research Laboratories Inc., and Norman G. Schreiner, Linde Air Products Co.

Tools for Predetermining Preheat and Interpass Temperatures for Submerged Arc Welds, by Clarence E. Jackson and Arthur F. Shrubsall, Union Carbide and Carbon Research Laboratories Inc.

Tuesday Morning, Oct. 16

Inspection Trip

Arrangements have been made for an inspection trip to the plants of the Ford Motor Co.

Tuesday Afternoon, Oct. 16

Ship Structure

Welded Reinforcement of Openings in Structural Steel Plates, by D. Vasarhelyi and R. A. Hechtman, University of Washington.

Evaluation of Welding Procedure by Direct Explosion Testing, by G. S. Mikhalapov, Metallurgical Research and Development Co.

Investigation of Factors Which Determine Welded Performance, by C. Hartbower and W. S. Pellini, Naval Research Laboratory.

Upper and Lower Transition in Charpy Tests, by W. J. Harris Jr., J. A. Rinebolt and R. Haring, Naval Research Laboratory.

Hard Facing and Flame Hardening

Control of Rail-End Hardening, by La Motte Grover, Air Reduction Sales Co.

Hard Facing for Impact, by Howard S. Avery, American Brake Shoe Co.

Development of Fused Metallized Coatings, by Harrison S. Sayre, U. S. Naval Engineering Experiment Station.

Resistance Welding

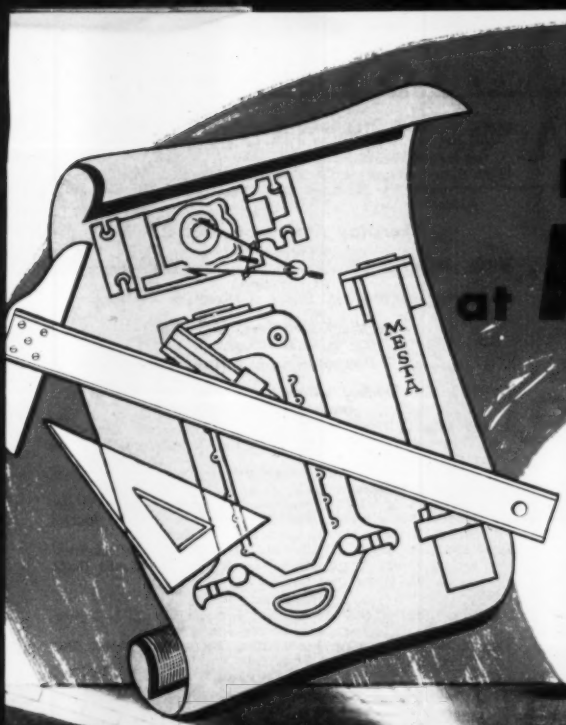
Trends in Electronic Nonsynchronous Resistance Welding Controls, by Stuart C. Rockafellow, Robatron Corp.

Flash Welding of Components for Aircraft and Similar Applications, by J. H. Cooper, Taylor-Winfield Corp.

Fatigue Strength of Spot-Welded Light Alloy Joints, by H. Kihara, president, Japan Welding Society.

Tuesday Evening, Oct. 16

Adams Lecture



ENGINEERING DEPARTMENTS at MESTA

A section in one of the Mesta Engineering Departments, where machinery to fit individual requirements is designed and plans for complete plant projects are developed. These include not only designs for the mechanical equipment built by Mesta, but also for buildings, foundations, electrical distribution systems, and all the engineering that is required for the creation of a modern industrial plant.

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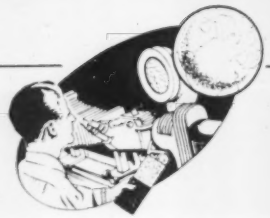

Wednesday Morning, Oct. 17

Production Welding

Welding Heat Exchanger for the Chemical Industry, by John W. Mortimer, professional engineer.

Product Design for Welding, by John Mikulak, Worthington Pump and Machinery Corp.

Welding Fixtures for Use with Submerged Arc, by J. P. Berkeley, Berkeley Equipment Co.

Pressure Vessels

Effect of Fabrication Processes on Steel Used in Pressure Vessels, by Dr. S. S. Tor, J. M. Ruzek, Dr. R. Stout, Lehigh University.

Biaxial Fatigue Tests on Flat Plate Specimens, by R. U. Blaser, L. F. Kooistra and J. T. Tucker Jr., Babcock & Wilcox Co.

Stresses in Large Horizontal Cylindrical Pressure Vessels on Two Saddle Supports, by Leonard P. Zick, Chicago Bridge and Iron Co.

Gas Cutting

Oxygen Cutting of Defence Equipment Materials, by A. H. Yoch, Air Reduction Sales Co.

Heavy Scrap Cutting, by L. P. Elly, Bethlehem Steel Co.

Powder-Washing for Metal Removal, by R. S. Babcock, Linde Air Products Co.

Wednesday Afternoon, Oct. 17

Weldability

Relation of Notch Strains to Bend Angles in the Notched-Bend Test, by A. E. Flanigan, professor, University of California, and Ernest M. Emery, North American Aviation Co.

Repeated Load Tests on Welded and Prestrained Steel, by Dr. S. S. Tor, J. M. Ruzek, Dr. R. D. Stout, Fritz Engineering Laboratory, Lehigh University.

Micro-Mechanism of Fracture in Tension-Impact Test, by W. H. Bruckner, University of Illinois.

Welding and Brazing

Nested Electrodes for Metal Arc Welding, by W. A. Snyder, University of Washington.

Welding in Steel Mill Maintenance During Defense Period, by R. L. Deily, Air Reduction Sales Co.

Dilution and Diffusion Aspects of Brazing, by R. D. Wasserman and Joseph F. Quaas, Eutectic Welding Alloys Corp.

Stainless Steels

Welding of High-Alloy Steel Castings, by R. D. Thomas Jr., chairman, WRC Committee.

Structural Stability of Welded Joints Between Dissimilar Metals in High-Temperature Service, by R. W. Emerson, Pittsburgh Piping & Equipment Co.

Thursday Morning, Oct. 18

Educational

Selecting and Training Welding Operators for the Defense Program, by A. N. Kugler, Air Reduction Sales Co.

Metallurgy for the Welding Student, by J. D. Paterson, Cass Technical High School.

Tentative Standards for School Welding Shops, by Carl H. Turnquist, Cass Technical High School.

Welding Instruction in the Public Schools, by A. D. Althouse, Detroit Public Schools.

Weldability

Arc Welding of Carbon-Molybdenum Steel Pipes, by F. J. Winsor, E. I. du Pont de Nemours & Co.

Residual Stresses Due to Circumferential Welds in Seamless Mild Steel Pipe, by L. J. Privoznik, Standard Oil Co. (Ind.)

Heat Treating Properties of Low-Hydrogen Electrode Weld Metal, by D. C. Smith and W. G. Rinehart, Harnischfeger Corp.

High-Temperature Welded Joints, by R. H. English, National Alloy Steel Co.

Inert-Arc Welding

Inert Gas Shielded Metal Arc Welding of Magnesium, by Paul Klain, Dow Chemical Co.

Aircomatic Welding of Ferrous Metals, by E. DiLiberti, Air Reduction Sales Co.

Metal Transfer in Shielded Inert Gas Metal Arc Welding, by R. T. Breymeier, Union Carbide and Carbon Research Laboratory.

High-Speed Consumable Electrode Machine Welding for Aircraft, by Bernard Gross and R. A. Smith, Rohr Aircraft Corp.

Thursday Afternoon, Oct. 18

Symposium

Filler Metal Specifications for Inert-Gas and Submerged-Arc Welding

Business Meeting, Board of Directors Meeting

Thursday Evening, Oct. 18

Annual Dinner

Presentation of Awards

Friday Morning, Oct. 19

Inert-Arc Welding

Aircomatic Welding-Refinery Components and Pressure Vessels, by S. Yaczko, United Engineers & Constructors Inc.

Shielded Inert Gas Metal Arc Welding, by H. T. Herbst, Linde Air Products Co.

Performance of High-Strength Aluminum Alloy Weldments, by W. R. Apblett and W. S. Pellini, Metallurgy Division, Naval Research Laboratory.

Thoriated Tungsten Electrodes—Their Welding, Characteristics and Applications, by G. J. Gibson and R. O. Seitz, Air Reduction Sales Co.

Metallizing

Fundamentals of the Metallizing Process, by F. J. Keller, Aluminum Research Laboratories.

New Developments on Metallizing During the Past Ten Years, by Sam Tour, Sam Tour and Co.

Typical Applications of Metallizing, by K. B. Smith, Dix Engineering Co.

Institute of Metals Division, AIME

PROGRAM

All Sessions at Detroit-Leland Hotel

Monday, Oct. 15, 9:00 a.m.

Grain Growth and Recrystallization

Grain Structure of Aluminum-Killed Low Carbon Steel, by R. L. Solterand, C. W. Beattie, Armco Steel Corp.

Theory of Grain Boundary Migration Rates, by D. Turnbull, General Electric Co.

Secondary Recrystallization in Copper Wire, by G. Basile, A. B. Svenska, Metallverken, Sweden.

Cleavage and Polygonization of Molybdenum Single Crystals, by N. K. Chen and R. Maddin, Johns Hopkins.

Monday, Oct. 15, 9:00 a.m.

Alloy Systems—I

Systems Titanium-Molybdenum and Titanium-Columbium, by M. Hansen, H. D. Kessler and D. J. McPherson, Armour Research Foundation, and E. L. Kamen, U. S. Naval Reserve.

Crystal Structure of Ti_2Si, Ti_5Ge_3 and Ti_5Sn_3, by P. Pietrokowski and Pol Duwez, California Institute of Technology.

Solidification of Lead-Tin Alloy Droplets, by J. H. Hollomon and D. Turnbull, General Electric Co.

Equilibrium Relations in Magnesium-Aluminum-Manganese Alloys, by R. J. Nelson, Aluminum Co. of America.

Constitution and Precipitation Hardening Properties of Copper-Rich Copper-Tin Beryllium Alloys, by R. A. Cresswell and J. W. Cuthbertson, Tin Research Institute (England).

BUSINESS IN MOTION

To our Colleagues in American Business . . .

For several years this space has been used to tell how Revere has collaborated with its customers, to mutual benefit. Now we want to talk about the way our customers can help us, again to mutual benefit. The subject is scrap. This is so important that a goodly number of Revere men, salesmen and others, have been assigned to urge customers to ship back to our mills the scrap generated from our mill products, such as sheet and strip, rod and bar, tube, plate, and so on. Probably few people realize it, but the copper and brass industry obtains about 30% of its metal requirements from scrap. In these days when copper is in such short supply, the importance of adequate supplies of scrap is greater than ever. We need scrap, our industry needs scrap, our country needs it promptly.

Scrap comes from many different sources, and in varying amounts. A company making screw-machine products may find that the finished parts weigh only about 50% as much as the original bar or rod. The turnings are valuable, and should be sold back to the mill. Firms who stamp parts out of strip have been materially helped in many cases by the Revere Technical Advisory Service, which delights in working out specifications as to dimensions in order to minimize the weight of trimmings; nevertheless, such manufacturing operations inevitably produce scrap. Revere needs it. Only by obtaining scrap can Revere, along with the other companies in the copper and brass business, do the utmost possible in filling orders. You see, scrap helps us help you.

In seeking copper and brass scrap we cannot appeal to the general public, nor, for that matter, to the small businesses, important though they are, which have only a few hundred pounds or so to dispose of at a time. Scrap in small amounts is taken by dealers, who perform a valuable service in collecting and sorting it, and making it available in large quantities to the mills. Revere, which ships large tonnages of mill products to important manufacturers, seeks from them in return the scrap that is generated, which runs into big figures of segregated or classified scrap, ready to be melted down and processed so that more tons of finished mill products can be provided.

So Revere, in your own interest, urges you to give some extra thought to the matter of scrap. The more you can help us in this respect, the more we can help you. When a Revere salesman calls and inquires about scrap, may we ask you to give him your cooperation? In fact, we would like to say that it would be in your own interest to give special thought at this time to all kinds of scrap. No matter what materials you buy, the chances are that some portions of them, whether trimmings or rejects, do not find their way into your finished products. Let's all see that everything that can be re-used or re-processed is turned back quickly into the appropriate channels and thus returned to our national sources of supply, for the protection of us all.

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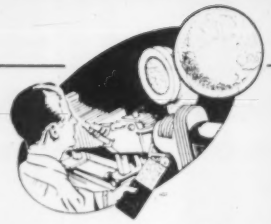

Monday, Oct. 15, 2:00 p.m.
Seminar—Dislocations in Metals

Nature of Dislocations, by Frederick Seitz, University of Illinois.

Role of Dislocations in Crystal-Growth and Grain-Boundary Phenomena, by W. T. Read, Bell Telephone Laboratories.

Monday, Oct. 15, 8:00 p.m.
Seminar—Dislocation in Metals

Theories of Dislocations as Applied to Mechanical Behavior, by Egon Orowan, Massachusetts Institute of Technology.

Tuesday, Oct. 16, 9:00 a.m.
Transformations

Rapid Tempering of High Speed Steel, by A. E. Powers, General Electric Co., and J. F. Libach, Lehigh University.

Effect of Rate of Cooling on the Alpha-Beta Transformation in Titanium and Titanium-Molybdenum Alloys, by Pol Duwez, California Institute of Technology.

Burst Phenomenon in the Martensitic Transformation, by E. S. Machlin and Morris Cohen, Massachusetts Institute of Technology.

Isothermal Formation of Martensite at Sub-zero Temperatures in a High Chromium Steel, by C. S. Das Gupta, University of Notre Dame, and B. S. Lement, Massachusetts Institute of Technology.

Isothermal Transformation and Properties of a Commercial Aluminum Bronze, by A. H. Kasberg, Jr., Westinghouse Electric Corp., and D. J. Mack, University of Wisconsin.

Tuesday, Oct. 16, 9:00 a.m.
Alloy Systems—II

Crystal Structure of UAl_4, by B. S. Borie, Jr., Oak Ridge National Laboratories.

Intermediate Phases in Ternary Alloy Systems of Transition Elements, by P. A. Beck, University of Notre Dame; Sheldon Rideout and W. D. Manly, Oak Ridge National Laboratories; E. L. Kamen, U. S. Naval Reserve; and B. S. Lament, Massachusetts Institute of Technology.

Intermetallic Compounds in the System Molybdenum-Beryllium, by S. G. Gordon and G. E. Klein, Los Alamos Scientific Laboratory and J. A. McGurty and W. J. Kosshuba, NEPA Project.

Chromium-Nickel Phase Diagram, by S. Bloom and N. J. Grant, Massachusetts Institute of Technology.

Effect of Tungsten or Molybdenum Upon the Alpha-Beta Transformation and Gamma Precipitation in Cobalt-Chromium Alloys, by A. R. Elsea and E. E. Fletcher, Battelle Memorial Institute.

Tuesday, Oct. 16, 2:00 p.m.
Light Metals

Effects of Pre-Compression on the Behavior of the Aluminum Alloy 24ST, During Cyclic Direct Stressing, by S. I. Liu, Pei-Yank University.

Structure Studies of Plastic Deformation in Aluminum Single Crystals, by N. K. Chen, Johns Hopkins University, and C. H. Mathewson, Yale University.

Effect of Alloying Elements on the Elevated Temperature Plastic Properties of Alpha Solids Solutions of Aluminum, by J. E. Dorn, O. D. Sherby and R. A. Anderson, University of California.

Effect of Alloying Elements on the Electrical Resistivity of Aluminum Alloys, by A. T. Robinson and J. E. Dorn, University of California.

Tuesday, Oct. 16, 2:00 p.m.
Creep

Fundamental Effects of Cold Working on the Creep Resistance of an Austenitic Alloy, by D. N. Frey and J. W. Freeman, University of Michigan.

Creep Characteristics of Some Platinum Metals at 1382° F, by Ralph H. Atkinson, D. R. Furman, International Nickel Co.

Creep Behavior of Zinc as Modified by Copper in the Surface Layer, by Earl R. Parker and M. R. Pickus, University of California.

Creep and Stress Rupture Behavior of Aluminum as a Function of Purity, by Italo S. Servi and N. J. Grant, Massachusetts Institute of Technology.

Tuesday, Oct. 16, 7:00 p.m.
Institute of Metals Division Fall Dinner

Wednesday, Oct. 17, 2:00 p.m.
High Temperature Oxidation of Metals and Alloys

Oxidation of Titanium, by M. H. Davies and C. E. Birchenall, Carnegie Institute of Technology.

Thermal Stability of the Chromium, Iron and Tungsten Borides in Steaming Ammonia and the Existence of a New Tungsten Nitride, by Roland Kiessling and Y. H. Liu, University of Uppsala, Sweden.

High Temperature Oxidation of Copper-Palladium and Copper-Platinum Alloys, by D. E. Thomas, Westinghouse Electric Corp.

Mechanism and Kinetics of the Scaling of Iron, by M. H. Davies, M. Y. Simnad, and C. E. Birchenall, Carnegie Institute of Technology.

Thermal Variation of Young's Modulus in Some Fe-Ni-Mo Alloys, by Morris E. Fine and W. C. Ellis, Bell Telephone Laboratories.

Wednesday, Oct. 17, 2:30 p.m.
Powder Metallurgy

Role of Gases in the Production of High Density Powder Compacts, by Donald Warren and J. F. Libsch, Lehigh University.

Solubility Relationships in Some of the Ternary Systems of Refractory Mono-Carbides, by John T. Norton, Massachusetts Institute of Technology and A. L. Mowry, Kaiser Aluminum and Chemical Co.

SNT — Society for Nondestructive Testing

Society for Non-Destructive Testing
PROGRAM
All Sessions at Hotel Detroiter

Monday, Oct. 15, 9:30 a.m.

Technical Chairman: John Smack, Sperry Products Inc.

Sonic Comparator Used on Grinding Wheels, by R. G. Rowe, Carborundum Co.

Ultrasonic Testing of Railroad Rails, by Peter K. Block, Branson Instruments Inc.

Curved Crystal Developments, by C. R. Betz, Magnaflux Corp.

Monday, Oct. 15, 2:00 p.m.

Technical Chairman: R. C. McMaster, Battelle Memorial Institute.

Triboelectric Effect and Its Application to Sorting Metals, by Anthony Doschek, Doschek Associates.

Testing of Ceramics, by Harry Staats, Magnaflux Corp.

Internal Microstrains and Deformation and Failure of Metals, by P. E. Cavanaugh, L. J. Dijkstra and U. Martius, Ontario Research Foundation and B. Chalmers, University of Toronto.

Radiographic Porosity Standards Versus Tensile Properties of Light Alloy Castings, by I. S. Feinberg and J. J. Pierce, U. S. Naval Ordnance Laboratory.

Tuesday, Oct. 16, 9:30 a.m.

Technical Chairman: Hamilton Migel, Magnaflux Corp.

Problems Concerning Inspection with Penetrants, by Arch Walters and R. C. McMaster, Battelle Memorial Institute.

ORDERS from Uncle Sam?

SEE NOX-RUST FOR YOUR RUST PREVENTIVES...

To fight the battle against rust, Uncle Sam has drafted rigid requirements for rust preventives that are used in packaging metal parts and products. To find the proper product conforming with these Federal Specifications, call on NOX-RUST . . . the world's largest manufacturers of rust preventive products. NOX-RUST has the answer for you . . . all prepared in a handy chart that shows Federal Specifications, uses, applications and specific product recommendations. For your free copy of this chart, just use the handy coupon below.

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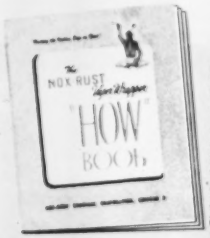
Just call NOX-RUST. Chances are an existing product can fill the bill for you. Or, NOX-RUST can build a product around your problem, as they already have done for many major corporations. For complete information, call or write NOX-RUST today.



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Here's a NEW way to package parts and machines without oil or grease coatings. NOX-RUST's new Vapor-Wrapper delivers your parts "factory fresh"—sparkling clean—ready for immediate assembly or use. Send for the "HOW" book that shows case histories of how others have eliminated slushing and de-greasing problems with Vapor-Wrapper. It's yours FREE . . . from NOX-RUST—Headquarters for all Rust Preventive Products.

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Tiny holes? . . . . . Easy!

Accurate holes? . . . . . Easy!

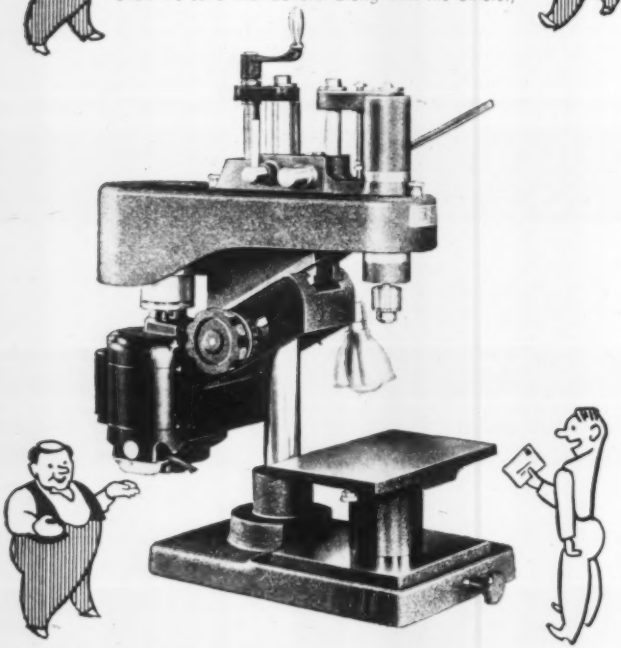
Holes on production schedules? . . . . . Easy!

***Tiny, accurate* holes on *production schedules?* . . . WOW!**

Hamilton Drilling Machines can do it!
And withdraw the drill undamaged
from hole after hole after hole!

LEARN HOW!

Write for the series of Hamilton Drilling Machine Bulletins and Price Lists.
(There is also a companion Tapping Machine. Shall we send that bulletin along with the others?)



Shown here is the Hamilton Varimatic, Super Sensitive, Variable Speed, Small Hole Drilling Machine, one of four models, each particularly adapted to the work for which intended, all equally precise.

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Photoelectric Scanning of Magnetic Particle Indications, by S. A. Wenk and Donald Cooley, Battelle Memorial Institute.

Multi-Directional Magnetic Particle Inspection, by R. A. Peterson, Magnaflux Corp.

Theoretical and Practical Sensitivity Limits in Fluoroscopy, by D. T. O'Connor and D. Polansky, U. S. Naval Ordnance Laboratory.

Tuesday, Oct. 16, 2:00 p.m.

Technical Chairman: Noah Kahn, New York Naval Shipyard.

T-V Pickup of X-Ray Images, by Russell Morgan, John Hopkins Hospital.

T-V Pickup of X-Ray Images with Pin Point Apertures, by Robert J. Moon, University of Chicago.

Selection of X-Ray Detectors for Automatic X-Ray Inspection Applications, by J. E. Jacobs and A. L. Pace, General Electric X-Ray Corp.

Intensifying Brightness of Fluoroscopic Images, by Walter S. Lusby, Westinghouse Electric Corp.

Wednesday, Oct. 17, 9:30 a.m.

Symposium on Ordnance Materiel Testing

Chairman: William McKenzie, Naval Gun Factory.

Small Arms Parts Inspection, by H. P. Langston, Springfield Armory.

Tank Parts Inspection, by J. K. McDowell, Rock Island Arsenal.

Gun Mount Inspection, by C. M. Underwood, Northern Ordnance Inc.

Wednesday, Oct. 17, 2:00 p.m.

Symposium on Jet Engine Part Inspection

Chairman: J. Manuele, Westinghouse Electric Corp.

Ultrasonic Testing, by George Sippel, Allison Division, General Motors Corp.

Fluorescent Penetrant Testing, by William Buckman, Thompson Products Inc.

Radiography Testing, by James H. Bly, Pratt & Whitney Division, Niles-Bement-Pond Co.

Magnetic Particle Inspection, by A. Robinson, General Electric Co.

Thursday, Oct. 18, 9:30 a.m.

Technical Chairman: Gerold Tenney, Los Alamos Scientific Laboratory.

The Metallurgist's Role in Interpretation of Non-Destructive Tests, by Scott Henry, A. O. Smith Corp.

Non-Destructive Testing Personnel Problems, by Leslie Ball and T. K. Chatham, Naval Ordnance Laboratory.

Picker Poleroid One-Minute Radiography, by J. A. Reynolds, Picker X-Ray Co.

Thursday, Oct. 18, 2:00 p.m.

Chairman: W. E. Thomas, Magnaflux Corp.

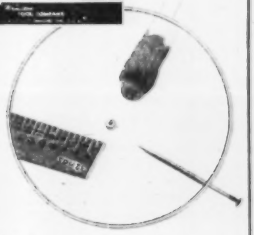
Honor Lecture, by Donald M. McCutcheon, Ford Motor Co.

Annual Business Meeting

EXHIBITORS
At the Metal Show

	Booth No.
A & B Centerless Grinding Co., Detroit	A115
A. B. C. Die Casting Machine Co., Chicago	G127
Acetogen Gas Co., Detroit	A215
Acme Mfg. Co., Detroit	D103
Acme Steel Co., Chicago	C221
Acme Tool Co., New York	A205
Adamas Carbide Corp., Harrison, N. J.	H218
Air-Flo Compressor Co., Akron	H219
Ajax Electric Co. Inc., Philadelphia	F421
Ajusto Equipment Co., Toledo, O.	H147
Allegheny Ludlum Steel Corp., Pittsburgh	G459
Allied Products Corp., Detroit	F302
Allison Co., Bridgeport, Conn.	H431
Alloy Engineering & Casting Co. Inc., Champaign, Ill.	B107
Alox Corp., Niagara Falls, N. Y.	C112
Alvey-Ferguson Co., Cincinnati	H502
American Brake Shoe Co., New York	F339
American Chain & Cable Co. Inc., Bridgeport, Conn.	A342
American Cyanamid Co., New York	G452
American Gas Association, New York	G160
American Gas Furnace Co., Elizabeth 8, N. J.	G154
American Machine & Metals Inc., East Moline, Ill.	B246
American Metal Market, New York	C110
American Metals Co., Ltd., New York	G459
American Optical Co., Buffalo	B128
American Platinum Works, Newark, N. J.	G240
American Pullmax Co. Inc., Chicago	A249
American Silver Co. Inc., Flushing, N. Y.	D129
American Society of Tool Engineers, Detroit	H245
American Wheelabrator & Equipment Corp., Mishawaka, Ind.	F439
Ames Precision Machine Works, Waltham, Mass.	A152
Amplex Mfg. Co., Detroit	G416
Anchor Drawn Steel Co., Latrobe, Pa.	D345
Anderson Bros. Mfg. Co., Rockford, Ill.	H351
Anderson Oil Co., F. E., Portland, Conn.	F255
Angier Corp., Framingham, Mass.	G139
Applied Research Laboratories, Glendale, Calif.	G121
Arcos Corp., Philadelphia	F457
Aronson Machine Co., Arcade, N. Y.	C127
Ashdee Products Inc., Homewood, Ill.	G361
Ashworth Bros. Inc., Worcester, Mass.	D140
Atlas Press Co., Kalamazoo, Mich.	A241
Aurora Metal Co., Aurora, Ill.	C215
Austenal Laboratories Inc., New York	B142
Avon Tube Division, Rochester, Mich.	C237
Babcock & Wilcox Tube Co., New York	F374
Baird Associates Inc., Cambridge, Mass.	H427
Bakelite Division, New York	F322
Baker & Co., Inc., Newark, N. J.	A363
Baldwin-Lima-Hamilton Corp., Philadelphia	D311
Banner Mfg. Co., Milwaukee	H302
Bausch & Lomb Optical Co., Rochester, N. Y.	B102
Bell & Gossett Co., Morton Grove, Ill.	A308
Bernard Welding Equipment Co., Chicago	H220

(Please turn to Page 181)



THE MOST NEWS
and
THE BEST NEWS

ABOUT SMALL, PRECISION SPUR GEAR HOBBING

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FOR A MINUTE AND A PENNY

Does your job involve small, precision spur gears? Would you like to produce them fast?

Whether your work calls for long production runs or frequent set-ups, you need to know about the Hamilton No. 00 Precision Spur Gear Hobber. Spend a minute now to send your request for a copy of our Bulletin No. H-00-49. Acquaint yourself with this efficient tool, and be ready for the challenge ahead.

NOTE: If you are interested in helical gears, worm gears, bevel gears, and crown gears, as well as spur gears, ask for Bulletin H 1-49. No obligation.

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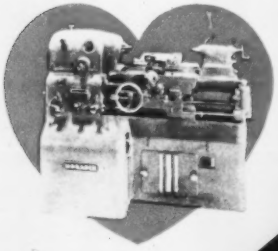
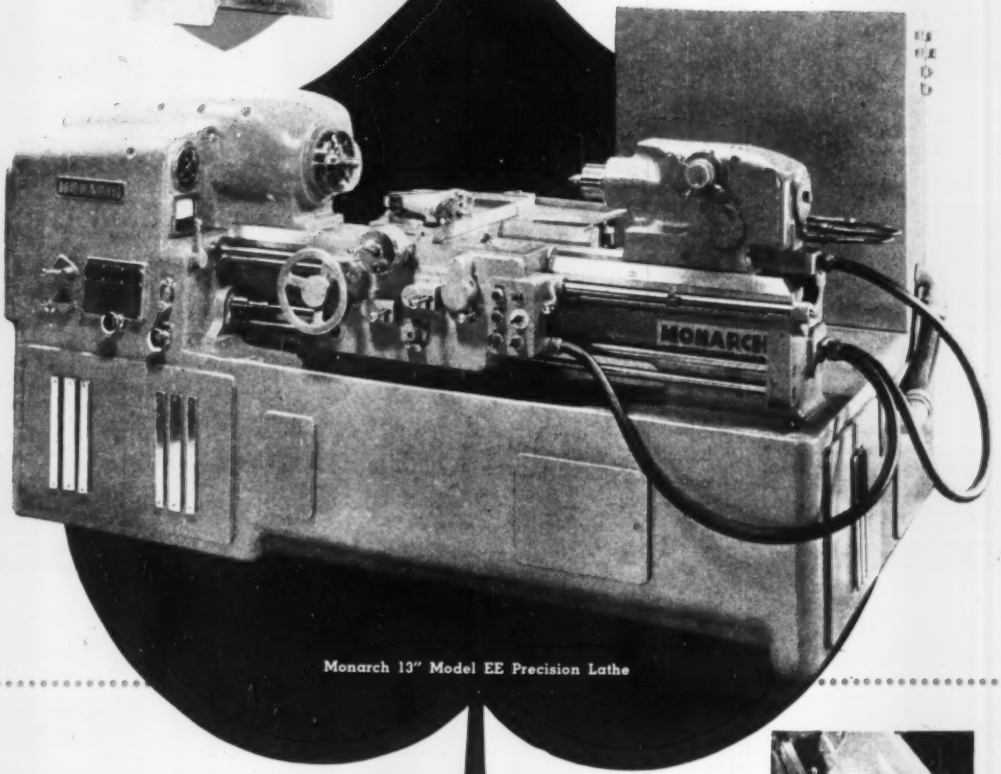
This One New

You're acquainted with this sweetheart—the 10" Monarch Model EE—one of the most popular lathes ever built. Over 6,000 in use.

Now—Monarch introduces the EE's big brother—the larger lathe you have been asking for. Not simply a larger EE, this new lathe embodies features never before perfected and combined in any lathe.





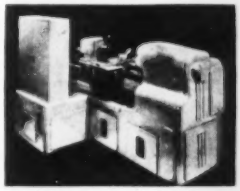
Monarch 13" Model EE Precision Lathe

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

The mere touch of this button unclamps the 385 pound tailstock —a slight push or pull moves it along the bed while release of the button reclamps it. Its 3¾" diameter spindle is indicative of the strength built into the entire machine.

Ace Takes EVERY Trick!

Toolmaker's Lathe! Manufacturing Lathe! The New MONARCH 13" MODEL EE PRECISION LATHE is a Standout in Both Roles



Here's the first and only truly dual purpose lathe ever made!

In the toolroom, it provides toolmaker's precision—plus a new high standard in amount of work output. On manufacturing operations, it slashes turning time unbelievably, with no sacrifice of its basic accuracy. For more profitable performance in *each* use, and unequalled performance in *both*, the Monarch 13" Model EE is your answer for practically every type of turning.

Everything about this machine represents fresh engineering thinking. Consider these features.

1. Built-in constant surface cutting speed. Becomes operative at the flick of a switch. With it, the operator is *always* using the most efficient cutting speed. Finish and accuracy are improved; turning time on some facing operations can be reduced up to 50%.

2. All-hydraulic tailstock. Nothing like it on any other lathe. Hydraulic positioning and clamping permits almost effortless repositioning of this 385 lb. unit in a matter of a few seconds. Hydraulic feed and traverse to the spindle. Drilling and reaming operations performed with a quickness and ease never thought possible heretofore.

3. Infinitely variable speeds up to 2000 R.P.M. In four overlapping ranges and provided by a 15 H.P. variable speed motor. The number of speeds is limitless—the one which is ideal for the job at hand can always be secured. High speed range direct to spindle through multiple "V" belts for the ultimate in high finish performance.

4. Electrical speed change. It's practically instantaneous. The turn of a knob gives every speed within a given range; change-over from one speed range to another is automatic immediately upon resetting of selector knob. No calculating of lever settings by reference to an index plate. Nothing could be as simple, as quick, as positive.

5. Four-way rapid tool traverse. Cross traverse in and out and longitudinal traverse right or left provided by individual motor drive. Tool repositioning couldn't be made easier or faster.

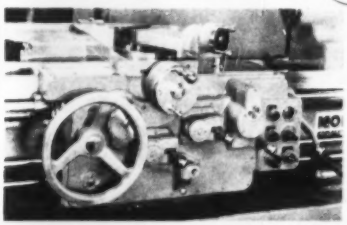
6. Flexibility unlimited. It's difficult to find a lathe job which the 13" Model EE cannot handle. There are 66 thread and feed changes. Regular equipment includes a ball bearing taper attachment, direct length reading dial, thread chasing stop, apron controlled leadscrew reverse with automatic stop in both directions, steady rest and follow rest.

Surely, you'll want to know more about this lathe whose features place it in a class all its own. The complete story is in booklet No. 502. Just fill in the coupon and we'll send it gladly.

Monarch

ACCURACY • ECONOMY • LONG LIFE

TURNING MACHINES



Complete control of the machine is concentrated at the apron which is always convenient to the operator. Besides the usual controls found on conventional lathe aprons, this one is provided with complete control of the four-way rapid tool traverse, the built-in constant surface cutting speed and full electrical control of the speed change and the work drive motor. Add to this also the apron controlled lead-screw reverse.

THE MONARCH MACHINE TOOL COMPANY, SIDNEY, OHIO

Gentlemen:

Please send me without obligation your Booklet No. 502 giving full information and description of the Monarch 13" Model EE Precision Lathe.

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COMPANY _____ TITLE _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

CALCIUM CYANAMID • • •

A Source of Nitrogen in Steel

OPERATING experience has shown that nitrogen in low-carbon, semikilled, rimmed and capped grades of steel promotes aging or precipitation hardening, affects grain sensitivity, and increases hardness and tensile strength. Considerable work has been done on the addition of nitrogen to high chromium content alloy steels including several stainless grades, as well as several low-carbon resulphurized steels. Nitrogen additions also increase the hardness and corrosion resistance of cutlery steels and other martensitic stainless steels without detrimentally affecting corrosion resistance.

Calcium cyanamid was first used by the steel industry to make nitrogen bearing alloy steels.[1] It was found that small additions of cyanamid (2 to 3 pounds per ton of steel) could produce grain refinement and materially increase the strength, hardness and wear resistance of these steels. It is generally conceded that the nitrogen content of cyanamid causes these phenomena. Large quantities of calcium cyanamid are used today for this purpose, according to American Cyanamid Co.

Tin plate producers are the largest users of cyanamid as a source of nitrogen for steel. Almost without exception, tin mills have found cyanamid useful to increase temper hardness. Moreover, this increase in hardness can be obtained with a minimum of cold rolling, sometimes 50 per cent less than that necessary for lower nitrogen strip.[7]

Higher nitrogen content has proved highly successful for several hot-rolled applications such as drum body and end stock.[4,6,7] Such stock is reported to be less susceptible to fluting, and will form and weld easily. Both hot and cold rolled strip and sheet of this type can be used for containers, bands, signs, stoves, wrapper sheets for refrigerators, etc.

Nitrogen bearing steels can also be used for moderate drawing applications where stiffness and buckling resistance are of importance.[7]

Calcium cyanamid is also being used to increase the nitrogen content of resulphurized and/or rephosphorized low-carbon capped or rimmed steels.[4,6,8] Considerable improvement in machinability can be obtained.

In some of the applications mentioned herein, investigators have found that corrosion resistance has been simultaneously increased.[1,2,3,4] For example, nitrogen bearing tin cans are believed to be less susceptible to corrosion caused by citrous acids when pin holes expose the base iron. Similarly, reports have been received indicating that nitrogen bearing steels are better suited for the corrosion problems encountered with underground culverts.

At least one investigator believes calcium cyanamid might be useful as a secondary slag reducing agent. Another group reports unusually clean ingot surfaces can be obtained with nitrogen bearing heats.

It has been reported that calcium cyanamid can reduce the sulphur and oxygen content of certain grades of steel.[1,3,4,5] It is believed that the decomposition products of cyanamid react with these elements to form compounds which are carried away from the steel by ebullition or agitation. An increase in the recovery of manganese has also been noted.

Calcium cyanamid normally is used as a ladle or runner addition. Operating data collected from numerous sources show that nitrogen recoveries can range from 10 to 30 per cent, the average recovery being about 20 per cent. Using this average figure, approximately 0.45-pound of cyanamid should be added to a ton of steel to increase the nitrogen content 0.001 per cent. Recoveries reported by individual operators are fairly consistent. The variation noted above is apparently the result of different techniques, operating conditions, temperatures, composition of heats, etc.

Open-hearth and electric furnace nitrogen recoveries are approximately the same, despite the theory that electric furnace recoveries should be considerably better.

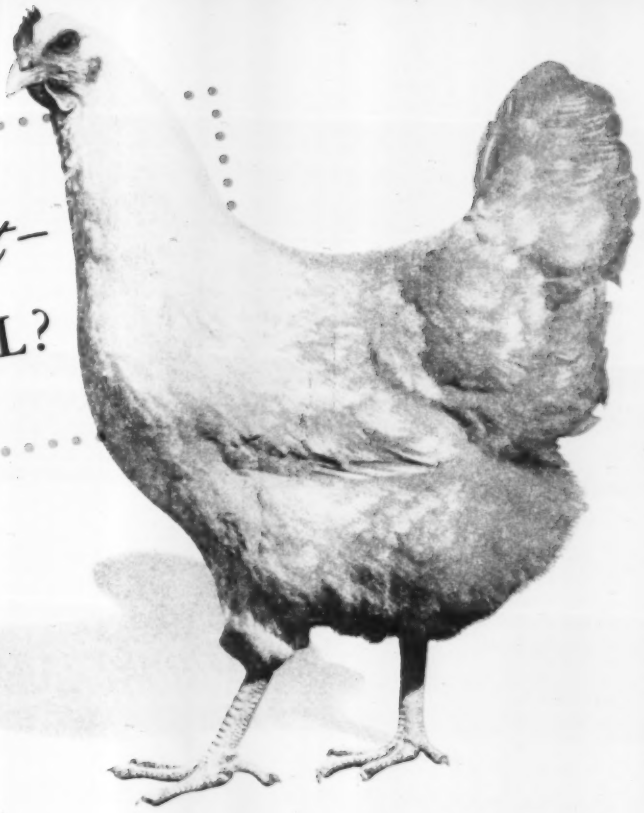
In open-hearth practice, most operators make the cyanamid additions when the ladle is partially filled. Additions to the ladle before tapping usually give lower nitrogen recoveries. Recent reports have indicated that highest recovery can be obtained through runner additions. Electric furnace additions are usually made in the furnace along with the other standard additions.

A typical analysis of calcium cyanamid is as follows:

	%	Equivalent—Nitrogen, %	Equivalent—Carbon, %
Calcium cyanamid	69.46	24.3	10.40
Calcium carbide	0.65		0.24
Calcium sulphide	1.35		
Calcium fluoride	0.98		
Calcium oxide	12.72		
Magnesium oxide	0.10		
Carbon	12.30		
Silicon	0.86		12.30
Moisture	0.15		
Undetermined	1.43		
Total	100.00	24.3	22.94

The decomposition temperature of calcium cyanamid is approximately 2450° F, which is much higher than any of the other high nitrogen bearing

Which comes first— STEEL *or* OIL?



STEEL and oil have become as closely related as the chicken and the egg. Any sizable increase in steel production calls for a like increase in oil producing and refining capacity. More steel means more machines, ships, locomotives, trucks, planes and a myriad of other steel products that need fuels and lubricants. And that will take more steel to drill wells and to build pipe lines and refineries.

New steel plants and refineries are both "first" at McKee—and both in a hurry. McKee maintains separate divisions for iron and steel plant and petroleum refinery design, engineering and construction. The combined technical knowledge and experience of these two divisions are particularly advantageous to McKee clients in the present expansion program.

DESIGN, ENGINEERING AND CONSTRUCTION FOR THE IRON AND STEEL AND PETROLEUM REFINING INDUSTRIES

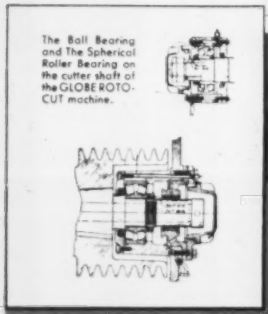
McKee *Engineering*

Arthur G. McKee & Company • Established 1905

Headquarters: McKee Building, 2300 Chester Avenue, Cleveland 1, Ohio; *New York:* 30 Rockefeller Plaza, New York 20, N. Y. *Tulsa:* 2805 West 40th Street, Tulsa 7, Oklahoma. *England:* The Iron and Steel Division of Arthur G. McKee & Company, is represented by Head, Wrightson & Co., Ltd.

GLOBE ROTO-CUT meat cutters are the standard of the Packing Industry. They produce better meat products at higher speed.

The Ball Bearing and The Spherical Roller Bearing on the cutter shaft of the GLOBE ROTO-CUT machine.



The Globe Company says:

THIS LUBRICANT INCREASED BEARING LIFE FROM 2 WEEKS TO 2 YEARS

"After we had quite a few of our large high speed ROTO-CUT meat cutting machines in actual production operation, the ball and spherical roller bearings on the cutter shaft gave us serious trouble. Some bearings did not last even two weeks.

"In an effort to correct the difficulty, we contacted a number of the large lubricant manufacturers. We tried all the lubricants their engineers recommended without the slightest success. We checked with the manufacturers of the bearings who assured us that the bearings were not overloaded. The trouble was the condition that prevails throughout the meat packing industry, animal acids and moisture, a combination most harmful to ball and roller bearings.

"Then, Ball Bearing LUBRIPLATE was called to our attention. The results we obtained from its use were most gratifying and amazing. We have had these ROTO-CUT machines lubricated with Ball Bearing LUBRIPLATE in continuous operation, twenty-four hours a day, three hundred days a year for over *two years without a single bearing replacement.* We now use LUBRIPLATE for factory lubrication and recommend it to our customers for use on practically all the equipment we manufacture."

THE GLOBE COMPANY
Frank J. Bilek (Chief Engineer)

YES, LUBRIPLATE LUBRICANTS ARE DIFFERENT! They reduce friction, wear and power consumption . . . prevent rust and corrosion and last longer than ordinary lubricants. LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases. There is a LUBRIPLATE product best for your every lubrication need. Write for case histories of the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION • Fiske Brothers Refining Company
Newark 5, New Jersey • Toledo 5, Ohio

DEALERS EVERYWHERE • SEE YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE the Modern Lubricant

compounds. Cyanamid is not hazardous to use. The decomposition products of cyanamid at 2500 to 3000° F are nitrogen, calcium oxide, and carbon dioxide. No hydrocyanic acid is formed.

Calcium cyanamid is available in granular form. The latter was developed specifically for the steel industry and is designated as 6-16 Special Cyanamid. It is relatively free of dust with 100 per cent passing through a 6-mesh screen and 90 per cent retained on a 16-mesh screen.

This special cyanamid is now available in paper bags containing approximately 25 pounds each. For protection during shipment and subsequent storage seven bags are, in turn, packed in a steel drum. This package was developed with the cooperation of several large mills to give them a package which could be handled easily without repacking.

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1. Smith and Motok, U.S. Patent 2,121,005 (1938) (To Republic Steel Corp.)
2. Smith and Motok, U.S. Patent 2,121,056 (1938) (To Republic Steel Corp.)
3. Smith and Motok, U.S. Patent 2,121,057 (1938) (To Republic Steel Corp.)
4. Smith and Motok, U.S. Patent 2,255,016 (1941) (To Republic Steel Corp.)
5. U.S. Patent 1,087,900 (1914)
6. "Steels for Elevated Temperature Service", United States Steel Corp. p. 21
7. Faddis, Open Hearth *Proceedings*, Vol. 32, 1949, p. 260.
8. Feigenbaum and Enzian, "Nitrogen in Steel" *Iron Age*, June 30, 1949, pp. 52-54.

New Alloying Process Developed

Magnesium alloys can be formed by a metallic-powder compressing process rather than by the conventional process of melting magnesium together with other metals according to an Air Force report. The new alloying process consists of mixing atomized magnesium powder with powder of the alloying metals and extruding the powder mixture.

According to this report, the powder-extrusion process results in many alloys having higher strength than alloys of the same composition prepared by extrusion of billets. Powder extrusion is also said to make possible new alloy compositions not obtainable by the melting and casting process, and these new compositions are said to provide alloys of greater strength, improved corrosion resistance and better fabrication characteristics.

PB 104 431, *"Properties of Magnesium Alloys Fabricated from Atomized Powder"*, prepared by Dow Chemical Co. for the Air Force, 445 pages including tables and photographs, sells for $56.25 in photostat and $9.00 in microfilm form. Orders should be addressed to the Library of Congress Photoduplication Service, Publication Board Project, Washington 25, D. C. Enclose check or money order payable to the Librarian of Congress.

AX-5 and 401

5 standardized NATIONAL brushes for mill-type motors!

Utilizing 2 proven grades — AX-5 and 401

For heavy-duty, mill-type motors, you can't get better brushes than NATIONAL CARBON's STANDARDIZED brushes using grades AX-5 and 401. They handle heavy loads with ease and sturdily withstand the effects of vibration. They keep the commutator in fine shape, even after long service. And more, *only two brush grades are used for the five* STANDARDIZED *brushes.*

RESULT? Lower maintenance costs all along the line! Armature removal for commutator maintenance greatly reduced. And, don't forget, these brushes are STANDARDIZED. You can get 1 box or 10,000 boxes for the same low, flat price per brush. For convenience, order by NC number.

STANDARDIZED BRUSHES FOR MILL-TYPE MOTORS

NC Number	A.I.S.E. Std. No.	Specifications		Applications
20-4800	21	2½ x 1½ x ⅝	AX-5	MC 8-12-21-81-121 MD 104-406-408-412-416-418 W 610 K 4-KG4
20-5600	25	2½ x 1¼ x ⅝	AX-5	MC 50-608 MD 410 K5-KG5
24-4800	29	2½ x 1½ x ¾	AX-5	MC 12-60-101-121-612-614 MD 418 MT 00-0
24-5600	30	2½ x 1¼ x ¾ "Plytek" (⅝+⅛)	AX-5	MD 414-612-616
24-6400	32	2½ x 2 x ¾	401	MC 14-16-18-70-80-90-100 103-141-161-181-610 MD 420-421-422 SW 75-EW-FW-14W75-18W150-K6-KG6

Order by NC Number

FOR COMPLETE INFORMATION on NATIONAL CARBON's brush standardization program and the advantages it offers, write to National Carbon Company, A Division of Union Carbide and Carbon Corporation, Dept. ST.

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District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

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your plant is as OLD as its wiring system!

You can have the newest and best machinery money will buy; you may have the newest in modern plant design—but if your wiring system is obsolete you still have an old plant.

Fast-moving, full-scale production is being stymied in 9 out of every 10 industrial plants by overworked, obsolete wiring systems.

Now more than ever, you should be utilizing all the power you pay for. A dependable, up-to-date wiring system eliminates power breakdowns, lost man-hours . . . and adds strength to our national production.

Determine the condition of your plant wiring system today. Call in your utility, plant or consulting engineer or electrical contractor and arrange to have him survey your plant. And, most important of all, send for your free copy of *"Power Up—And Be Prepared."* This complete modern wiring guide shows you how efficient wiring systems cut down expenses and build up your power efficiency. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

the right cable for the job

ANACONDA®

WIRE AND CABLE

Who Has the World's Metals

(*Continued from Page 124*)

becomes the first problem tackled whenever an emergency arises. We have it now in the limitation orders on production of less essential products, and in the allocation of materials to products most urgently needed.

Leaner alloys offer a partial answer. More work is done in the substitution of carbon steels in applications for which alloys formerly were considered necessary. Boron steels hold promise of doing jobs where steels alloyed with more critical elements formerly were required.

Much work looking for practical substitutes for the scarce metals is underway; much more will have to be done before we can support a high-standard peacetime economy alongside a vast war economy. The complete answer to this problem is not yet in sight.

The situation in the more important metals is briefly described in the following:

IRON ORE

Foresight Paying Off

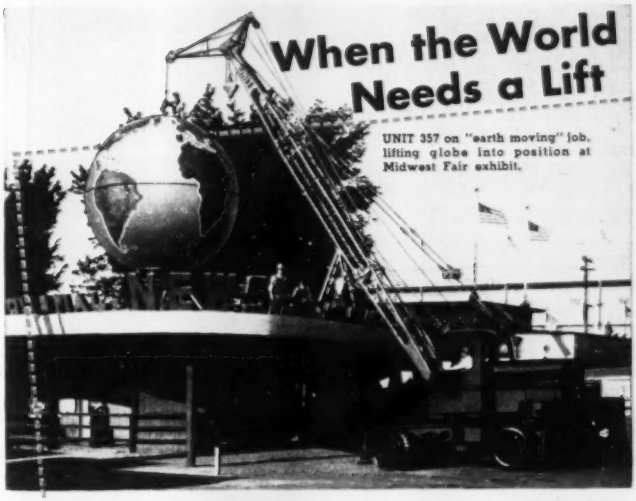
ALTHOUGH iron ore is one of the most common minerals, only two nations of the world have adequate reserves under their control to develop and expand their steel industries to support their positions in the world. They are the United States and Russia. For this reason, they may be rivals for world power for generations to come.

In point of development, Russia is not yet comparable with this country. We have a three-to-one advantage in steelmaking capacity and a similar advantage in iron ore production.

Who Has the Most?—In actual reserves, the United States has more ore and better ore than does Russia. John W. Gruner of the University of Minnesota estimates the reserves available to the United States, including Labrador, Venezuela and other South American countries, exceeds 8 billion tons. Iron content generally is better than 50 per cent.

Russia's actual reserves are estimated at 6 billion tons and the ore generally has a lower iron content than that available to the U. S.

The estimates include neither the taconite of the Mesabi range nor the



It Picks a UNIT to do the Job!

Yes . . . it's really amazing what you can do with a UNIT Crane or Excavator. Take a UNIT 357 Mobile Crane, for example. It travels anywhere! Any time! Powered by ONE engine . . . controlled and operated by ONE man. Compact, it has light-truck mobility — the smoothest operating and easiest handling crane made. Works efficiently even in small yards where space is limited. FULL VISION CAB gives operator complete visibility in all directions.

UNIT 357 is self-propelled . . . mounted on six pneumatic tires . . . duals on the rear . . . singles on the front. Balanced weight distribution keeps entire undercarriage on ground while working. Dimensions meet all highway requirements. Get the complete UNIT 357 story. Write for bulletin.

CONVERTIBLE TO ALL ATTACHMENTS

•

Rapid conversion, from one attachment or boom to another, is one of the many important UNIT 357 features. If the material handling operations in your plant call for magnet, crane, or clamshell, the UNIT 357 is the logical, and economical, answer to your problem. There is no limit to UNIT 357 versatility!

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THE STERLING GRINDING

ACCURATE SIZE, SUPERIOR FINISH, CRANKSHAFT WHEELS

Tested on all Types of Crankshaft Jobs, Sterling's "Wheels of Industry" Provide Unusual Economy and Longer Wheel Life

Crankshaft grinding is a very exacting operation. No other type of grinding imposes such harsh demands on grinding wheels. In the roughing operation, great amounts of stock have to be removed. Yet, in the finishing, very close limits are the rule. The crankshaft grinding wheel must stand up under these punishing operations, hold its corners and give long, money-making service.

Sterling Crankshaft Grinding Wheels, built to the special demands of your particular jobs, have a tailor-made, specification-spread that makes them applicable for the solution of any of your crankshaft grinding problems. Backed by the most intensive research and development program, Sterling's "Wheels of Industry" are offering extra value that is worthy of the investigation of those interested in obtaining the best.

Because of the intense study behind these superior wheels by our technicians and engineers, you can demand unusually fine finishes, far beyond what is ordinarily obtainable from crankshaft grinding wheels. To obtain the finest grinding results is a simple matter—write us today and our engineers will gladly arrange a wheel test on your machines to prove the high quality of the wheels that are best—Sterling's!

Best in the Test--That's STERLING!

In a recent test of a 42 x 1.465 x 12 Sterling "Wheel of Industry," this abrasive unit was very satisfactory on 80 lb. crankshafts, stock removal being .055 on O. D. and .070 on the sidewall. This wheel cut freely and held corners exceptionally well.

It was much better than the competing wheel and was designated by the customer as being the best wheel ever tested in this well known plant. Similar results may be obtained on your crankshaft grinding jobs with Sterling Grinding Wheels. Ask for a test today!

Write for These STERLING Research and Development Folders . . .

Anyone interested in better grinding will appreciate the important data to be found in this literature. The popular "Art and Science of Grinding," just off the press, is included in this group of books and folders. Together, they form a most complete series to keep in a handy file for ready reference. When quick decisions are necessary on various types of grinding jobs, you will welcome the information included in these folders. Ask for your copies today—no obligations!

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Think of your savings! Here's an exporter who has *scrapped slushing* and all the mess that goes with it! When grease and oil were smeared over these intricate machines, packaging time was over 9 man-hours. Now only 1½ hours does it!

The answer is . . . Angier VPI* Wrap. This chemically coated paper gives off a vapor that *prevents rust!* If you ship or store metal products or parts, this clean and *proven* new way to stop rust is a cinch! Your customers, too, will be all for it because there's no "cleaning" to do. Get the facts now in "Applications of Angier VPI Wrap." It's FREE!

*Reg. U. S. Pat. Off. Vapor rust preventive

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2 GREAT, NEW PORTER CUTTERS

for cutting hot steel bars, rods, wires, etc.

PORTER HOT METAL CUTTER

An ideal tool for steel mills and fabricating plants. Made of special hot work steel and special heat-treated jaws, for long life under continuous heavy duty with no loss to cutting edge temper.

#3HW cuts up to 5/16" dia. #4HW cuts up to 3/8" dia. Order through your industrial supply house!

for cutting extremely hard materials, including stainless steel

PORTER CARBIDE EDGED CUTTER

Another important Porter development for cutting extra hard materials, such as stainless steel rods, wires, pins, etc. Tough carbide edges are firmly brazed to cutting jaws. Stands up under the toughest usage! Pays for itself many times over. #3CE cuts up to 5/16" dia. #4CE cuts up to 3/8" dia.

H. K. PORTER, INC., 74 Foley Street, Somerville 43, Mass.

probable magnetic iron formations in the Kursk district of Russia.

Production—The United States last year produced just under 100 million gross tons of iron ore, nearly three times the output of Russia. Third largest producer was France with about 30 million tons. Sweden, United Kingdom and Germany followed in that order. No other country produced as much as 4 million tons during the year.

United States iron ore and steel interests have projects underway which will increase this country's production steadily to 132.5 million tons by 1955 to accommodate the vast expansion in steelmaking capacity.

Much of the additional ore will come from newly developed deposits in Labrador, Venezuela and Liberia. Development work in other Western Hemisphere countries is continuing. Brazil may become an important contributor to our ore supply in the years ahead.

How Much Domestic Ore—We have used more than 2650 million tons of Lake Superior ores. About 60 per cent of these came from the Mesabi range alone.

Much has been written on the approaching exhaustion of these rich deposits and there is little doubt that the Mesabi in the next decade or so will lose much of its importance as a source for rich ore. But it will continue to be our major source of supply for at least 10 years.

University of Minnesota officials estimate the probable reserves in the Lake Superior district (United States) as follows (in million of tons):

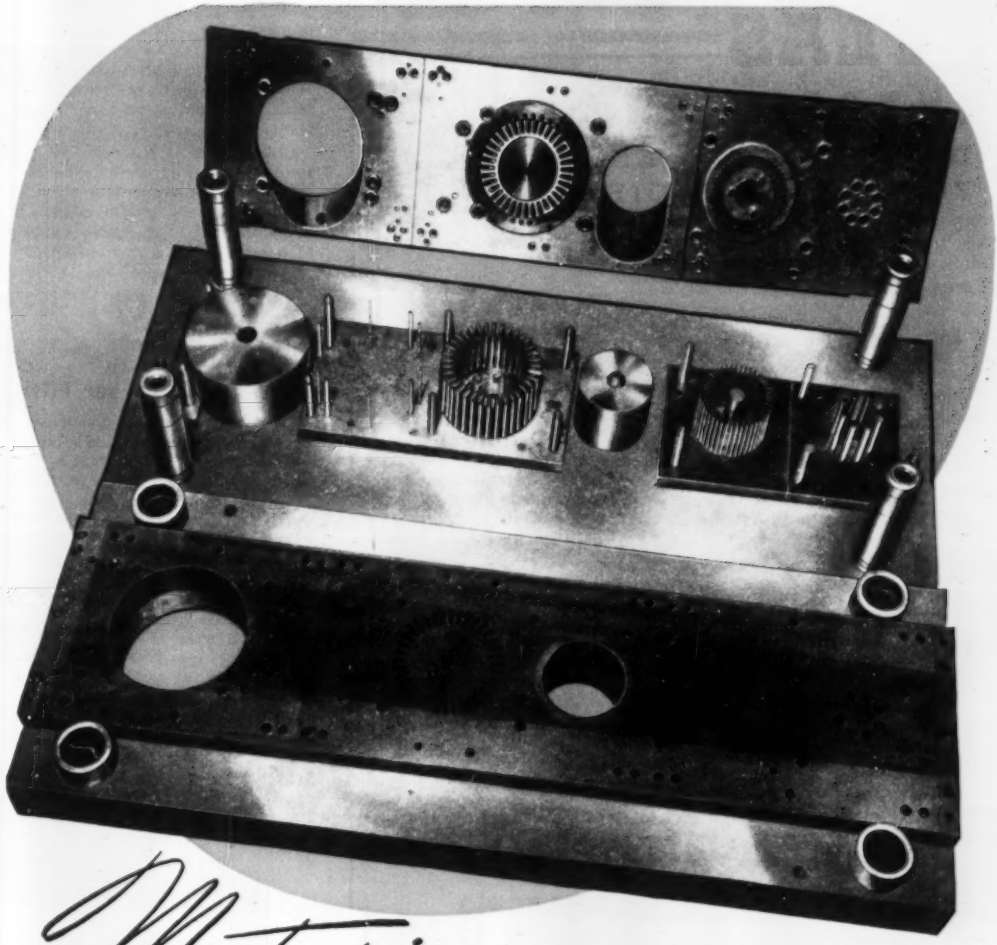
Mesabi (without low-grade oxidized ores)	1,100
Cuyuna, Vermilion	60
Michigan	480
Wisconsin	6
Total	1,646

These estimates include 250 million tons of ore in anticipated new discoveries.

Ore men believe production of the Lake Superior district will increase slightly over the next few years and that 94 million tons will be shipped from these mines in 1955.

The northeastern states will produce a little more ore and are expected to provide 6 million tons in 1955, as compared with an estimated 5 million tons this year. The western and southern states should hold fairly constant at 5.5 million and 8 million tons a year, respectively.

Taconite—The iron-bearing rock of the Mesabi will contribute rapidly increasing tonnages. Pilot plants are



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100,000 pieces per grind . . . 100% increase in production over former dies . . . is the outstanding performance of this Cromovan six station, progressive lamination die. The die punches out both rotor and stator laminations complete . . . from .025 silicon lamination sheets . . . clearance tolerance of .0007 inch per side is strictly maintained between punches and die. All cutting surfaces of this die are made of CROMOVAN.

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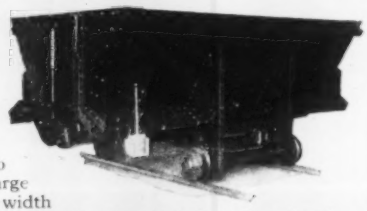
DESIGNED AND ENGINEERED
FOR YOUR SPECIFIC NEEDS

STORAGE BATTERY FLAT CAR

60-TON
CAPACITY

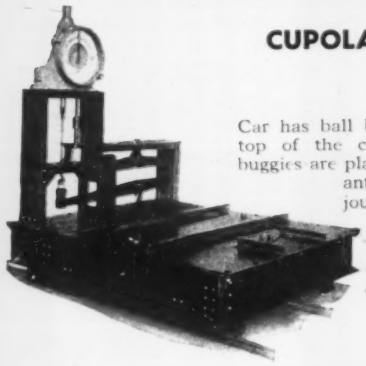
This self-propelled flat car operates on standard gauge track. Car provided with hydraulic electric brakes that can be operated by handwheel when long overhanging loads are encountered. These battery propelled cars are often provided with charging equipment mounted on car.

FURNACE CHARGING CAR, 8-TON CAP. CENTER DUMP



The discharge gates are so arranged as to spread the charge to the best advantage over the width of the furnace. Gates are hydraulically operated through a hand pump. Car is mounted on anti-friction roller bearings with spring mounted journals. Car provided with automatic engine couplers.

CUPOLA CHARGING SCALE CAR



Car has ball bearing steel turntable on top of the car upon which charging buggies are placed and weighed. Car has anti-friction bearings at main journals.

Send for illustrated booklet on all types of intra-plant cars.

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THE ATLAS CAR & MFG. CO.

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being operated on taconite by several iron ore companies. Last month Reserve Mining Co. started construction on a 2.5-million-tons-per-year beneficiating plant at Beaver Bay, Minn. The plant may be expanded to 10 million-ton capacity.

Less concern is felt now over the future of our iron ore supplies than at the close of World War II, when the drain on the Mesabi range was appraised and before steel and ore interests launched a vast ore development program.

ANTIMONY

We Import Four Fifths

BOLIVIA, Mexico and the Union of South Africa are the world's leading producers of antimony and it is from these countries that the United States draws the bulk of its needs. China, Czechoslovakia, Turkey, Hungary, Greece, Algeria, Peru, and Belgium also produce substantial quantities.

United States production last year was about 2500 net tons. We used almost 16,000 tons. Imports of ore and metal were nearly 15,000 tons. Antimony is one of the metals being added to our strategic stockpile.

About 60 per cent of the antimony used in this country goes into metal products. Antimonial lead takes the lion's share, while bearing metal and type metal take large quantities.

Nonmetallic uses are for frits and ceramic enamels, paints and lacquers, ammunition primers, flameproofed textiles and in plastic.

ALUMINUM

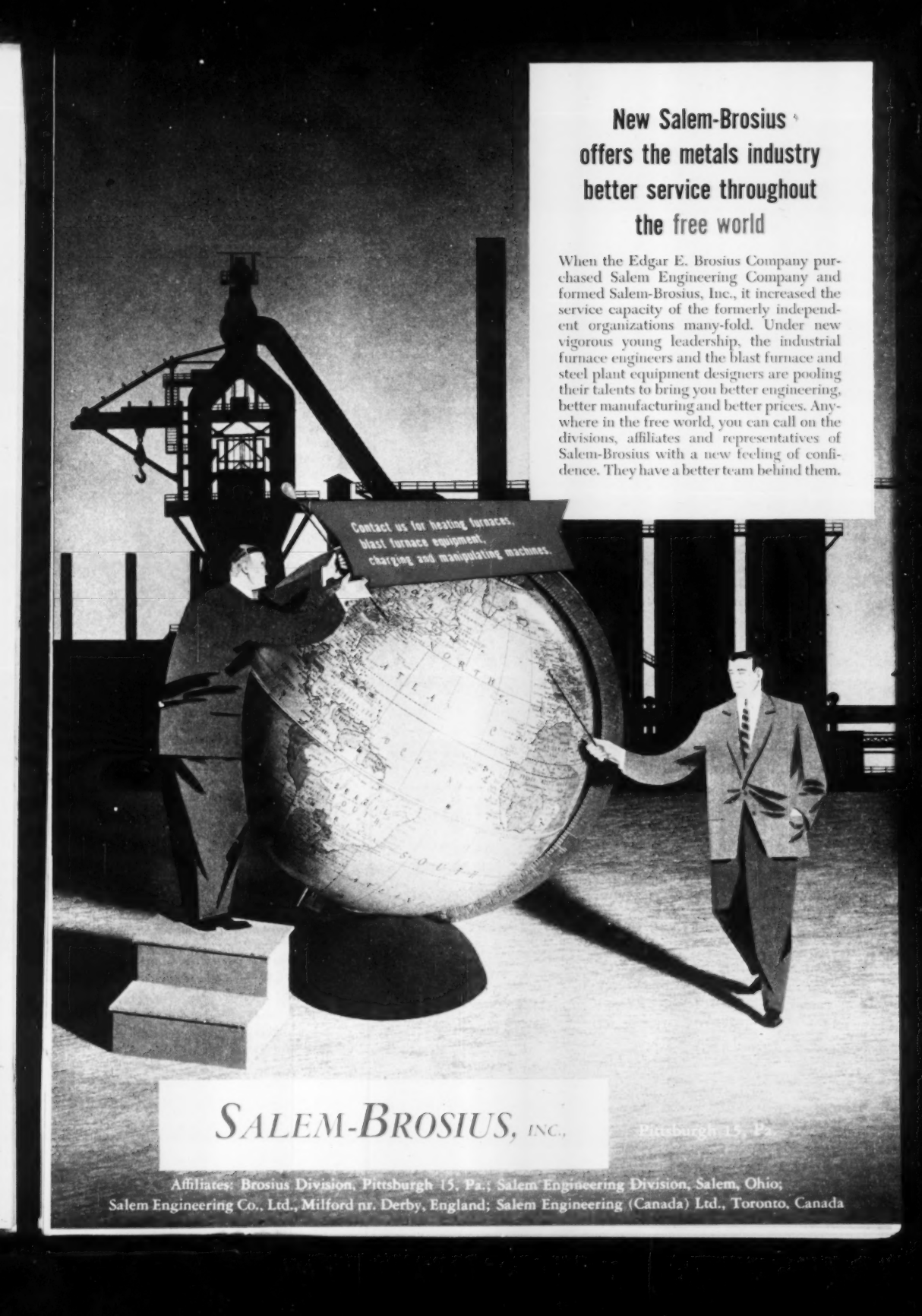
Supply Tight, but Growing

THE United States and Canada last year accounted for about 70 per cent of the world aluminum production. This country's output was 718,000 net tons, while Canada produced 395,000 tons of a world total of 1,631,000 tons.

Russia is the third largest producer with estimated 1950 output of 210,000 tons.

Many European countries produce aluminum but their output does not bulk large in comparison with North America's.

Outlook — This year, the United States will produce about 800,000 tons. Projected expansions will raise capacity to 1,100,000 tons by mid-1953, plus an additional 80,000 tons of high-cost capacity. There is serious talk of expanding capacity to 1,700,-



New Salem-Brosius offers the metals industry better service throughout the free world

When the Edgar E. Brosius Company purchased Salem Engineering Company and formed Salem-Brosius, Inc., it increased the service capacity of the formerly independent organizations many-fold. Under new vigorous young leadership, the industrial furnace engineers and the blast furnace and steel plant equipment designers are pooling their talents to bring you better engineering, better manufacturing and better prices. Anywhere in the free world, you can call on the divisions, affiliates and representatives of Salem-Brosius with a new feeling of confidence. They have a better team behind them.

SALEM-BROSIUS, INC., Pittsburgh 15, Pa.

Affiliates: Brosius Division, Pittsburgh 15, Pa.; Salem Engineering Division, Salem, Ohio;
Salem Engineering Co., Ltd., Milford nr. Derby, England; Salem Engineering (Canada) Ltd., Toronto, Canada

COMPARE

your present ALUMINUM FINISHING PROCESS with these advantages of IRIDITE® Al-Coat

—see for yourself why more and more finishers of aluminum products are specifying Iridite Al-Coat for any wrought, cast or buffed aluminum part.

1. IN PROCESSING

Faster—Just one simple dip, 10 seconds or only two minutes, depending upon your finishing specifications. No sealing dip, no special drying.

Simpler—Non-electrolytic, no heating or exhaust units, operates at room temperature. No special precleaning baths required.

2. IN APPEARANCE

Clear—Protects metal without changing its original appearance.

Colored—Heavier, iridescent yellow film provides greater protection.

3. IN PERFORMANCE

Corrosion Resistance—Up to 1,000 hours salt spray on wrought stock, 250 hours on castings. Approved under government specifications.

Abrasion Resistance—Will not flake or peel from buffing, bending or scraping.

Paint Base—Blocks underfilm corrosion; grips paint, holds it firmly.

Welding—Finished surface can be spot welded, coating actually aids shielded arc welding.

Conductivity—Offers low surface resistance to electrical current.

4. IN COST

Comparative figures show that Iridite Al-Coat saves as much as 50% over other aluminum finishing processes. *Let us prove this to you.*

Write today for FREE SAMPLES of Iridite Al-Coat. Or, send samples of your product for test processing.

Iridite is approved under government specifications.

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Manufacturers of Iridite Finishes
for Corrosion Resistance and Paint Systems for Non-Ferrous Metals; ARP Plating Chemicals.

000 tons, provided power can be made available.

Equally impressive expansion plans are heard across the border in Canada. The Dominion has tremendous sources for low-cost hydro power. Over the next three to five years, Canada will more than double primary aluminum capacity.

Ore—Although the United States depends substantially on other countries for bauxite, plenty can be found in Western Hemisphere countries. Lower quality bauxite, of course, may have to be used. Surinam, British Guiana, Jamaica, Brazil, Haiti and the Dominican Republic have valuable deposits.

Armament Needs High—As long as the mobilization effort continues with its vast demands for aluminum, the supply will be tight. Civilian uses will be restricted. When war demands ease, civilian applications for aluminum will get a big boost.

COLUMBIUM

West Didn't Get Its Share

NIGERIA and the Belgian Congo practically have a monopoly on the production of high-grade columbite concentrates. This is one of the alloying metals which enable steel to stand up under the terrific heat necessary for jet engine use. The United States is pushing for more production in Nigeria and the Congo that the metal may be available for import. We are getting only a fraction of what we need and demand will rise rapidly as the jet engine program gains momentum.

Mozambique supplies small quantities and a little is coming in from Brazil.

New discoveries are reported in French Morocco and in the Freiberg area of Germany, but the extent or richness of the deposits has not yet been determined.

Nigeria last year produced nearly 2 million pounds of columbite concentrates. The Congo output was less than 300,000 pounds.

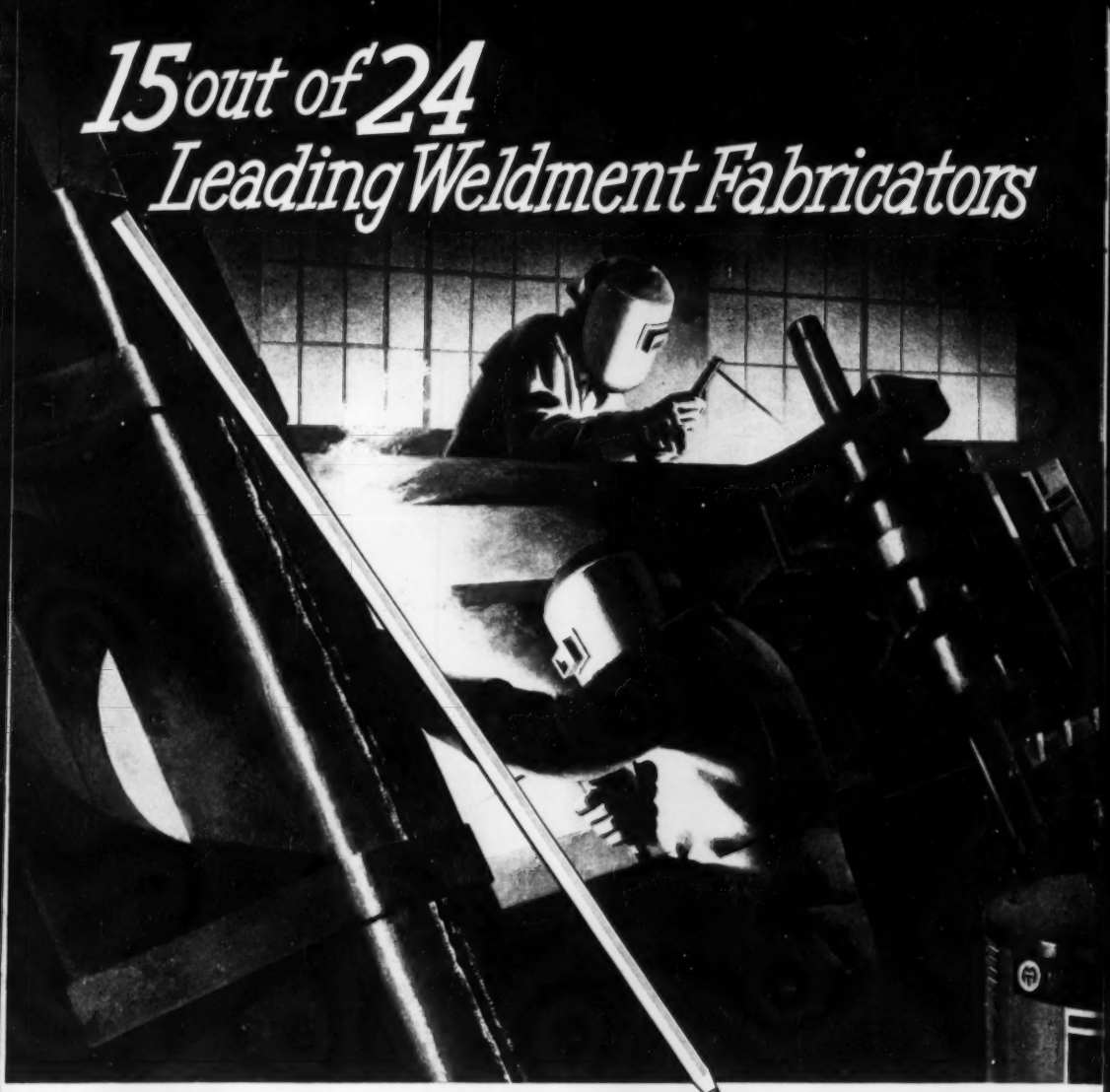
United States output was only 4000 pounds.

MOLYBDENUM

U. S. Out in Front

EIGHTY-FIVE per cent of the world production of molybdenum comes from the United States. Last year this country produced 14,239 net tons

15 out of 24 Leading Weldment Fabricators



*Among the twenty-four *top contract welding firms, fifteen regularly weld with Murex Electrodes.*

More of the leaders in important industries prefer Murex Electrodes in their welding operations because they can be sure of sound welding—high deposition rates for economy and speed of production.

*Those having AAAA directory ratings.

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It might be NEWS
TO YOU

only PRESTOLE builds ALL

SHEET METAL NUTS With a 360° Grip

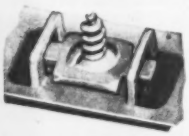
Over 1,000 Shapes and Sizes

"J" NUT

"J" Nuts—to fit all metal from .020 to .090 thick. Sizes from 6-32 to 5/16 machine and sheet metal screws. Made in all finishes. Same availability on "U" Nuts as "J". All with the conical dome formed with a full 360° locking grip around screw. No prongs to flatten or break.

HEX-LOX

Hex-Lox—the Hex Nut with both the 360° conical thread grip and the side-arm thread grip. Weighs 70% less than conventional lock nuts. Has highest installation torque, prevailing torque, and back off torque. Excells in vibration tests and tensile strength. Made in 5 screw sizes from 6-32 to 1/4-20. SAE-1060 steel .016 to .020 thickness.



CAGE NUT

One-Piece Cage Nuts—combines both nut and cage in one piece. No prongs. Full 360° unbreakable thread grip. Saves material, cuts parts in half, saves handling and assembly time. Made of SAE-1060 steel in all popular sizes.

PUSH ON

Push-Ons—for smooth studs. The PRESTOLE push-on clover leaf nut has also become very popular because of its 4 point spring tension bite on smoothest studs, whether metal, fibre or plastic. All sizes and finishes.

The growing demand for more PRESTOLE fasteners is due largely to its unique, precision engineered conical grip that bites a full 360° into the root of the screw thread. It's in all PRESTOLE fasteners except those made for smooth studs. PRESTOLE fasteners are preferred because of their greater holding power. Hundreds of millions in use on automobiles, trucks, refrigerators, stoves, heaters, radio, TV and scores of other products. In writing for samples, kindly send blueprints or details of application.

FAMOUS FASTENERS

PRESTOLE CORPORATION
1349 MIAMI ST. • TOLEDO 5, OHIO

of an estimated world output of 16,000 tons.

Seventy per cent of molybdenum is consumed in the manufacture of steel, to which it is added as molybdic oxide, calcium molybdate or ferromolybdenum. It increases steel's resistance to chemical attack. More recently it has been finding an expanding market in high-temperature alloys for jet engines, gas turbines and turbosuperchargers. The advantage here is its high melting point of about 4750° F.

Molybdenum also is used as an alloying element in spring steel.

From the West—Most of our molybdenum comes from the western states, with Utah, Colorado, New Mexico, California, Arizona and Nevada the leading producers. Although we are self-sufficient in the metal and normally export it, the supply now is extremely tight due to the large increase in demand.

Other Sources—Chile was the second largest producer in 1950, although output was only 880 tons. China, Mexico, Norway, Canada, Australia, Russia, Yugoslavia, Rumania, Turkey, Greece, Peru, and some other countries produce small quantities.

MANGANESE

Slag Recovery May Help

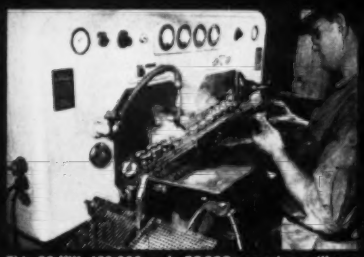
MANGANESE presents a complicated problem to the steel producing industry. Mills need more of it than any other metal except iron. Between 1.5 and 2 million tons are required annually.

More than 90 per cent of our manganese now comes from other countries. Russia supplied about a third of our requirements until supplies from that source were choked off. Major foreign sources of supply now are India, Union of South Africa, Gold Coast, Brazil and Cuba. Primitive mining and transportation methods in India and South Africa hinder shipments from those countries. This country is helping to improve those situations. Cuba's reserves are dwindling. Brazil has several promising deposits which are being developed further. A new deposit is reported in Labrador and likely areas in other Western Hemisphere countries are being explored.

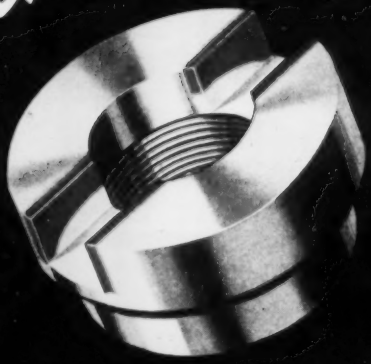
Domestic Ores Low Grade — The United States has large quantities of low-grade manganese ore but so far no method to beneficiate these ores on an economically sound basis has been commercially demonstrated. Much research is underway and sev-

Copper-plating
Carburizing
Cleaning
Rechasing threads

X .... Eliminated



This 20 KW, 450,000 cycle TOCCOtron tube oscillator unit handles 600 transmission nuts per hour.



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THE JOB—International Harvester Company, world-famous builder of farm machinery, uses TOCCO for the selective hardening of the special tractor transmission nut shown above. Only the contact surfaces are hardened. The bottom channel must remain soft or the part will crack, and any distortion would affect the threads. Material is C-1045 steel; production required 600 per hour.

THE RESULTS—Formerly the part was copper-plated before milling the slot. Then the slot was milled, the part carburized and hardened in a batch-type furnace. Finally the parts had to be cleaned and the threads rechased after hardening to assure proper fit. Now the adoption of TOCCO hardening eliminates these operations, stops distortion and saves $3.50 for every batch of 600 pieces.

● This job, typical of thousands of cost-saving TOCCO installations all over the world, may suggest ways you can reduce costs and speed production on hardening, brazing, annealing, forging or melting jobs in your own plant. Experienced TOCCO engineers are glad to work with you—without obligation, of course—for similar cost-cutting results.

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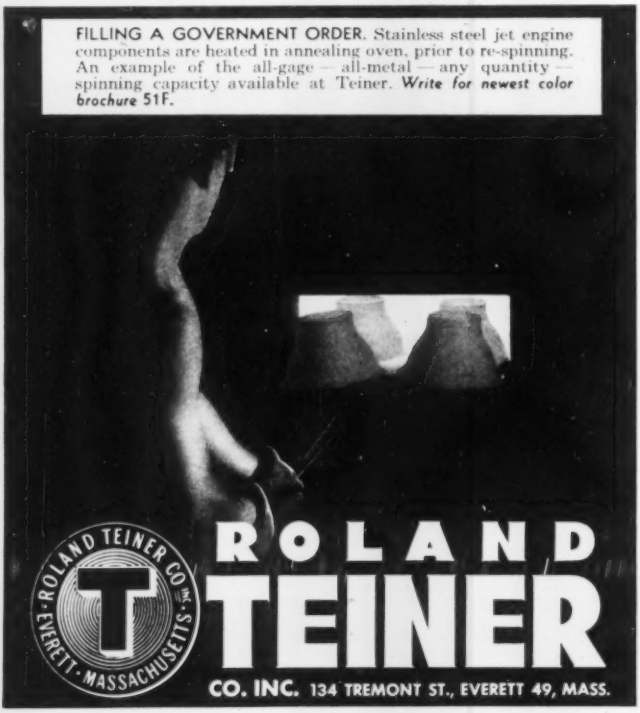
FILLING A GOVERNMENT ORDER. Stainless steel jet engine components are heated in annealing oven, prior to re-spinning. An example of the all-gage — all-metal — any quantity — spinning capacity available at Teiner. Write for newest color brochure 51F.
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eral processes hold considerable promise. Practically all domestic metallurgical manganese now comes from Anaconda, Mont.

Slag Offers Promises—More attention is being directed toward recovering manganese from open hearth slag which contains from 4 to 12 per cent manganese. The Bureau of Mines and the American Iron & Steel Institute have a process in the pilot plant stage. Several private companies have developed processes for which high claims are made. Should these processes prove out, they could make the United States largely self-sufficient in manganese.

MAGNESIUM

Raw Materials Aplenty

PRIMARY magnesium production is subject to violent fluctuation. In 1943, the United States produced 184,000 net tons. Three years later, output dropped to about 5000 tons. Last year's production was about 16,000 tons. Now it is on the climb again and 1951 output should treble that of last year.

Russia now is the second ranking producer and is believed to have turned out 6600 tons in 1950. United Kingdom is in third place with 5400 tons. Reports on production of several former important producers are not available.

Capacity Reactivated—When war clouds began to gather again, the government announced its plans to reactivate six of the plants held in standby—those located at Painesville, O., Velasco, Tex., Canaan, Conn., Manteca, Calif., Wingdale, N. Y., and Spokane. These have capacity to produce 98,000 tons of primary metal. Output from these plants will cost more than metal from Dow Chemical's Freeport plant and will be stockpiled by the government.

Power Is Problem—Raw materials are no problem in magnesium's future since it is produced mostly from sea water. Power is a potential bottleneck. The electrolytic process requires nine kilowatt hours per pound. The Pidgeon process requires about half as much, most of which is used in making ferrosilicon used in the process.

ZINC

Demand Exceeds Supply

WORLD production of zinc in 1950 was the highest since 1943, and modest increases will be made in 1951.

Wire Trouble?

When wire twists and tangles as it uncoils, you lose production time. That's why Chase mills pay so much attention to the "cast" of Chase copper alloy wire. Uniformity of temper and stress makes Chase wire conform to the shape of the coil and unwind smoothly.

It is free from physical defects . . . uniform in gauge, texture and color. For cold-heading, Chase wire is tops. Write for folder "Chase Cold-Heading Extruded Brass and Copper Alloy Wire."

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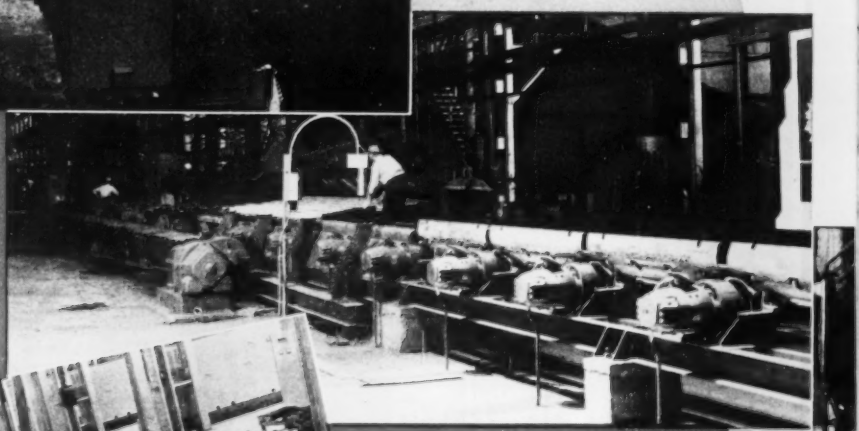

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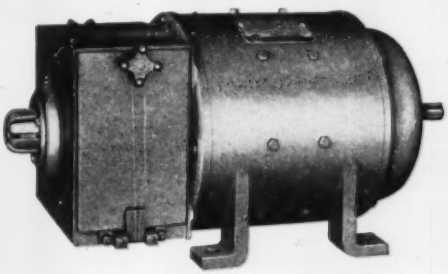

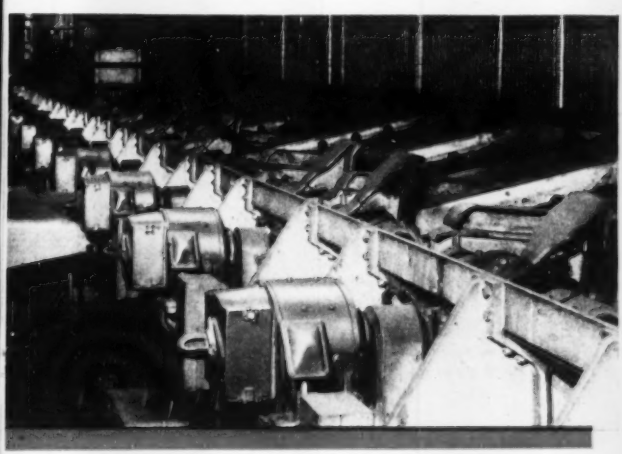

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Despite this increase, production will be inadequate to supply the accelerated consumer and defense demand. Limitations on the uses of zinc will continue.

The United States accounts for about 30 per cent of the world's zinc and is the leading producer. But its output falls short of domestic requirements. This year we will produce only about 70 per cent of our requirements. Canada and Mexico, which rank second and third among the world producers, supply the bulk of our imports.

More Ore, Less Slab—Mine production in the United States last year was 618,000 tons, while smelter production was about 300,000 tons higher. The difference was met by imported ores and by drawing on accumulated stocks of zinc ore. These stocks were reduced to rock bottom by the end of 1950.

So despite a possible 10 per cent increase in mine production this year, slab zinc production likely will be less.

Europe to Lift Output—Although North America produces more than half the world zinc supply, production is well scattered over the remainder of the world. Europe produces about 400,000 tons and projects are underway to increase output, particularly from mines in Belgium and Germany.

Russia is estimated to have produced about 142,000 tons, an increase of 50 per cent over production at the end of the war.

About 45 per cent of United States zinc is used in galvanizing. Die castings take about 30 per cent and brass products about 15 per cent of the remainder.

COPPER

A Continuing Problem

WHENEVER this country rearms, copper quickly becomes a problem. Demand soars and there is no quick way to boost production to accommodate the increased requirements. At the moment, copper is threatening to replace steel as the metal which will determine the ceiling on our productive capacity.

United States is the world's leading producer and for the past 30 years our mine productive capacity has held fairly constant at around 900,000 net tons annually. Until the mid-20s, this country produced more than half the world supply and exported substantial tonnages. Then mines in Chile, Northern Rhodesia, Canada and the Belgian Congo be-

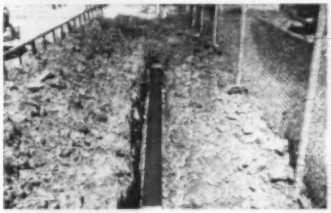
Reynolds
ALUMINUM REPORTER

★ ★ ★ Seventh in a Series to Industry on Aluminum Uses and Developments ★ ★ ★

HEAT-TREATABLE ALUMINUM EXPANDS USES

Aluminum Pipeline in Use 1½ Years Shows No Corrosion

Recent uncovering of the 40-foot bare aluminum by-pass installed approximately eighteen months ago in the Alabama-Tennessee Natural Gas Company's 8-inch aluminum pipeline revealed absolutely no discoloration or corrosion of any sort.



Unretouched photograph showing aluminum pipeline section after seventeen months underground.

This section of pipe was installed without any protective coating or wrapping to test the natural corrosion-resistance of aluminum.

Careful inspection both inside and outside was made to determine any sign of wear or corrosion. No corrosion of any type could be found on the outside, where the bare pipe was in contact with the soil; nor on the inside, which carried natural gas. The test period was approximately eighteen months.

Supervised by officials of the gas company and Reynolds, this inspection showed that aluminum pipe would last indefinitely under such conditions. Soil analyses were taken along with the test section and are available upon request from Reynolds Metals Company.

Aluminum pipeline after being removed from ground. Note absence of corrosion in this unretouched photo.

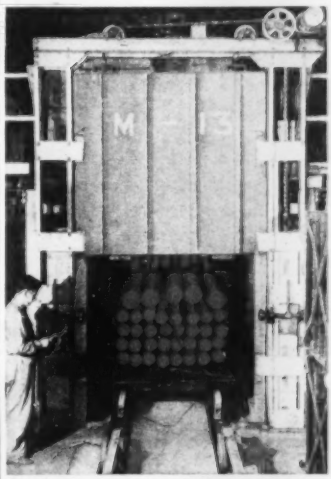
For further information on how the adaptability and corrosion resistance of aluminum can be applied to your product or problem, contact the Reynolds office or distributor listed under "Aluminum" in your classified telephone directory. Or, write to Reynolds Metals Company, 2576 South Third Street, Louisville 1, Kentucky.

Four Part Book Has Valuable Information for Both Non-Technical Men and Metallurgists

Until recently, little information has been available on methods of heat treating the aluminum alloys. There has been a great need for this information since aluminum has become one of America's foremost metals.

The improved strength, hardness and temper of heat-treatable aluminum, especially the comparatively new 75S alloy, have greatly expanded the use of this lightweight metal in almost all industries. Now aluminum can be used in more places and for more purposes than ever before.

A 144-page illustrated book, "Heat Treating Aluminum Alloys," that brings together all the latest information on the subject in a form readily usable by both the non-technical man and the highly trained technician is now available from the Reynolds Metals Company.

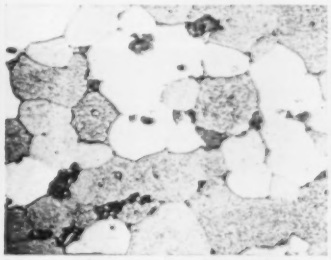


A 30,000 pound soaking furnace for handling billets. Note connections to thermocouples imbedded at various points in the load.

The book was prepared with the assistance and collaboration of some of the country's leading metallurgists and organizations. It contains photomicrographs, like the one in the column at right, showing the crystal structure for various treatments and alloys.

Divided into four parts for ready understanding and use, the book is handy for both desk and shop reference. Section One breaks down the subject into easily understandable concepts for the non-technical reader. Section Two presents in brief tabular form the recommended heat-treating cycles for specific aluminum alloys. Section Three is a technical discussion of the various treatments, possible difficulties and their cure. Section Four contains tables of mechanical properties for both wrought and cast alloys.

Application of the methods described in this book can improve the quality of your product and mean more profit for you through fewer rejects.



Structure of incorrectly heat-treated aluminum alloy R301. Excessively high temperature resulted in melting certain constituents at grain boundaries. Kellers etch. 500 X.

And if you have a *special problem* on design or fabrication with aluminum, take advantage of the trained staff of Reynolds Aluminum specialists waiting to help you. For prompt service, call the Reynolds office or distributor listed under "Aluminum" in classified telephone directories.

(Instructors are invited to request copies of this book for their senior and graduate engineering students. A 24-page condensation is also available without charge to other students.)

For your free copy of the valuable handbook, "Heat Treating Aluminum Alloys" plus a complete index of Reynolds technical literature, request today on business letterhead (otherwise price is $1.00). Write to Reynolds Metals Company, 2576 South Third Street, Louisville 1, Kentucky.

MORE INTERESTING NEWS ABOUT ALUMINUM ON NEXT PAGE

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Reynolds is putting forth every effort to ease your aluminum-buying problems. To meet the growing demand Reynolds Metals Company and other U. S. producers have already started on another vast expansion program which will greatly increase the country's aluminum production capacity.

To meet your immediate problems the nearby Reynolds distributor listed below is doing his level best to fill orders from limited stocks.

You can also count on his assistance and guidance in selecting temporary alternate materials. He will apply all of his experience and energy to helping you out. Present your procurement problems to him. Now as always he will give you the kind of service you need and want.

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United States Steel Supply Co., Los Angeles and San Francisco
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American Steel & Alleys Corp., Hartford

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REYNOLDS METALS

REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND

came more important. United States became a copper importer in the late 30s.

In the Ground—Ninety per cent of the known world reserves, estimated at 100 million tons, lie in Chile, South Central Africa, the western United States and southern Russia. African deposits are the richest averaging 3 to 6 per cent copper, compared with 2 per cent copper in Chile and generally less than 1 per cent in the United States deposits.

United States companies control the mining of about half the world's copper, Great Britain controls about a quarter and the remainder is controlled by many countries.

Russia produces about one-fifth as much as the United States and in 1950 accounted for an estimated 240,000 tons.

No Quick Increase—We cannot expect much relief from the copper shortage for some years. During the emergency here and ahead, essential requirements will be met by reducing the less essential uses.

The reason for this is that all phases of copper production—mining, smelting and refining—require years, not months, to get into operation. When the seriousness of the copper shortage was recognized after the Korean outbreak, industry men hoped for a 10 per cent increase in domestic copper production. The mine strike this summer pretty well wiped out those hopes.

Stockpile?—Government stockpiling is an additional load on producers. Just how large this stockpile is remains secret for security reasons, but it generally is guessed at about 500,000 tons. This would be equivalent to about four months' consumption at the current rate.

LEAD

Bidding Is Competitive

ALTHOUGH the United States is the world's largest mine producer of lead, it depends largely on imports and scrap to fill its needs. These three sources of supply are of about equal importance.

Our position in lead is complicated by the fact that the bidding for lead in the world market is competitive. It is difficult for American consumers operating under price ceilings to compete with foreign buyers in the world market.

Fortunately Mexico and Canada are among the other leading producers and we have certain advantages in trade relations and geography.

The Production Picture—World lead production last year amounted to

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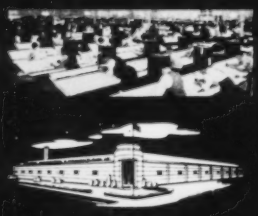

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INQUIRIES PROMPTLY ANSWERED

1,702,000 net tons. The United States produced about 430,000 tons; Mexico, 247,000 tons; Australia, 232,000 tons; Canada, 170,000 tons; and Russia, 123,000 tons.

The remainder of world production is well scattered among European, South American and African countries.

Consumption—Industrial use of lead in the United States last year is estimated at 1,212,000 tons. The difference between mine output and consumption was made up by 395,000 tons recovered from scrap and by record imports of 521,000 tons.

Imports this year are tougher, owing to the fact that Europe is a more active bidder in the world market and is taking more lead from the dollar areas—Mexico, Canada and Peru. Imports this year may drop to about 250,000 tons.

Meanwhile, demand continues to rise. Prospects for free use of lead during the rearmament program are dim.

NICKEL

Across the Border

NICKEL rates high in criticality among the metals required for the defense program. One of the first metals to be rationed, the available supply falls far short of supplying needs. One defense official estimates needs exceed available supply fourfold.

The long-term outlook is fairly comfortable. Our friendly neighbor to the north, Canada, supplies about 75 per cent of the world supply and there is little question of continuing availability.

Production in 1950 totaled nearly 160,000 tons, of which 123,000 tons came from the Sudbury district of Canada. Russia controls the second largest productive source and mined an estimated 27,500 tons last year. New Caledonia rates a rather poor third with slightly less than 7000 tons. Cuba, an important source during World War II, has been inactive since 1947, but again will enter the picture.

Old Nick's Copper—Nickel earned its name because it originally was a nuisance. It was called Kupfer-Nickel (Old Nick's Copper) because it occurred with sought after copper and played havoc with the early methods of processing that metal. In the 1880s the rich Sudbury deposits of copper were considered doomed by the presence of nickel which refused to be separated from the copper in the early processes. It was not until the Orford process and later the Mond process were developed that nickel

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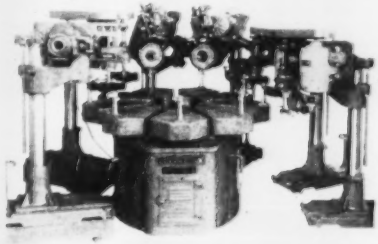

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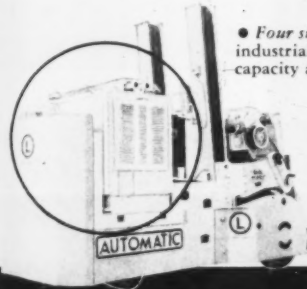


• Ready-Power Diesel-Electric Units and Gas-Electric Units will be on display in booth G-131 at the National Metal Exposition and Congress, October 14-19, Michigan State Fair Grounds, Detroit.

The READY-POWER Co.

3824 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

could be satisfactorily separated from copper.

Even then there was little market for nickel and in 1900 nickel consumption was only 4000 tons. World War I gave the metal its first big boost when it was used extensively to give toughness to armor plate. After World War I the bottom dropped out of the market and civilian uses for nickel had to be developed. The growing mechanization of industry with higher speeds and heavier loads and the rapid growth of the automotive industry helped nickel to an almost phenomenal growth. By 1939, production reached 130,000 tons and during World War II soared to 180,000 tons.

INCO Story—The story of nickel as we know it is essentially the story of International Nickel Co. which mines about 90 per cent of the Sudbury nickel. The remainder of Canadian nickel is mined by Falconbridge Nickel Mines Ltd.

While nickel production is being increased, conservation will be stressed as long as this country's armament program continues in high gear. There will be little nickel for civilian uses and many military uses will be restricted.

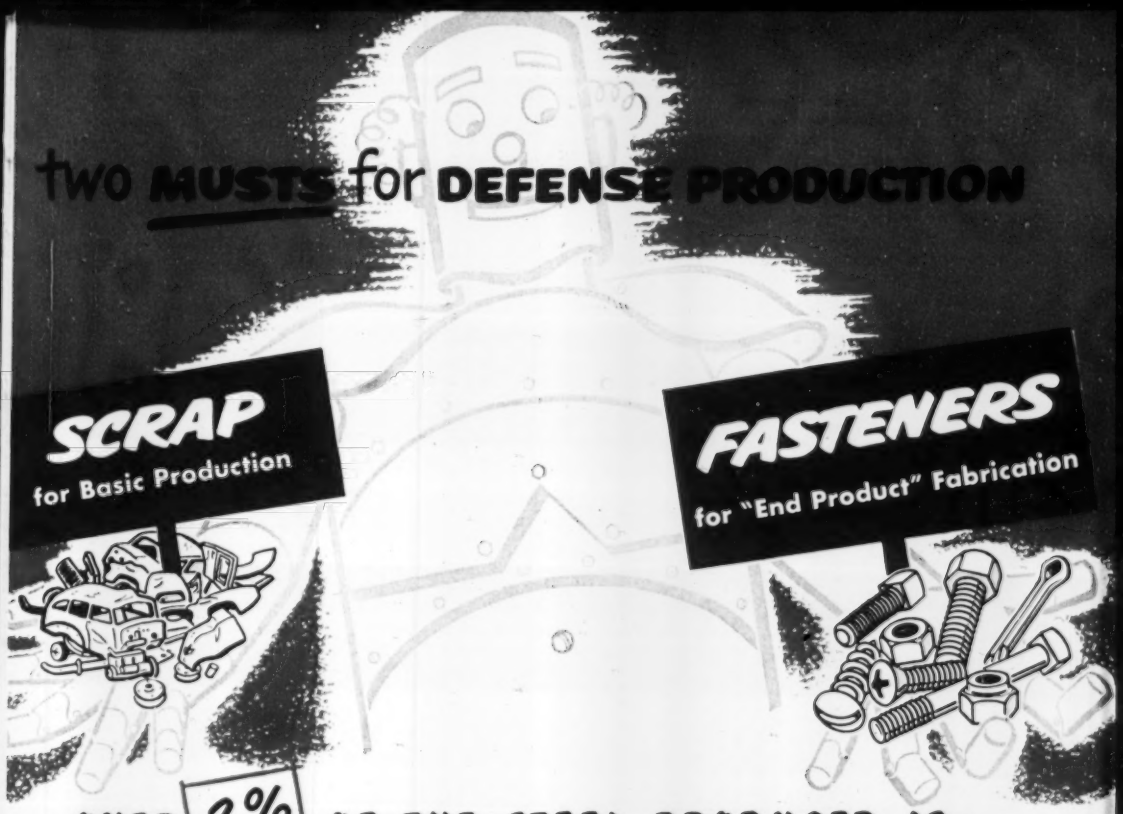
COBALT

Future Is Brighter

COBALT demand skyrocketed with the start of the Korean affair, and it became one of the first metals to cause concern. It is an important element in jet engines, electronic equipment including radar, generators for aircraft and tanks and has important applications in atomic energy projects. In civilian life cobalt is used in high-speed cutting tools, drills, welding rods, valves and magnets.

The United States has been using about 60 per cent of the world's production, which in 1950 amounted to 7800 tons. Ninety per cent of our supply comes from overseas. Belgian Congo is the leading producer and accounts for about 70 per cent of the total. Northern Rhodesia and French Morocco are fairly important producers and should supply more as ECA funds are used in the development of resources in those countries. The United States and Canada produce relatively small amounts. Production in both the Western Hemisphere countries can be expanded.

Balance by 1953—Plans for increasing output indicate that the supply-demand picture for cobalt will get much better and will be in approximate balance by 1953, barring an all-out war.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Steel is a basic commodity. Upon our ability to produce steel, and more steel, rests the success of our rearmament program and the very security of our country.

Scrap is an important ingredient of new steel. More and more scrap will be required as production expands.

But what about the end products of steel—the machinery, the weapons, the vehicles, the thousands of products fabricated from steel? That's where fasteners are a MUST. Without fasteners most of the steel produced would be of little use.

So when you think of steel as an important commodity, think of fasteners, too. *Both* are vital to our industrial economy and to the success of our defense effort!

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Cobalt occurs in many mineral forms and in many countries. Seldom do cobalt minerals occur by themselves, nor is the metal mined for itself alone. Cobalt often is found in chemical combination with arsenic in ores of nickel, silver and gold; with sulphur it is found with lead, zinc and copper; and in oxide form is often accompanied by copper.

As production of these metals is intensified, production of cobalt can be expected to rise. In Fredericktown, Mo., a new recovery process may recover 500,000 pounds of cobalt a year from lead and zinc ore refining. As research develops new processes for separating cobalt from its close affinity for other metals, Canadian and domestic ores may eventually supply most of our needs.

TUNGSTEN

Outlook Potentially Good

TUNGSTEN currently is in tight supply because supplies from China, the world's leading producer, no longer are available. But unlike tin and columbium, tungsten is widely scattered over the globe and in time we can insure adequate supplies.

The United States produces about one-third of its needs. In 1950, we produced 4853 net tons of concentrates containing 60 per cent tungstic oxide (WO_3), or about 13 per cent of the world total. Domestic production can be increased and output in other friendly nations also can be upped.

Historically, we have obtained large quantities of tungsten from China, which last year produced more than 12,000 tons, about 40 per cent of the world total, and from Korea. Wolframite and scheelite ores now are being imported from Australia.

Uses—Tungsten consumption soars sharply during rearmament. It has been a feast and famine metal, which accounts for the fact that exploration and development have not been carried far enough to make us self-sufficient.

High-speed cutting steels take more tungsten than any other use. It also is used in steels for armor-piercing shells, magnets, jet aircraft parts, erosion-resistant linings for heavy ordnance and other applications where steel must stand up under intense heat and pressure. In recent years, 40 per cent of our tungsten consumption has gone into ferrotungsten, the form in which most of the metal is introduced to steel. Another 20 per cent went to high-purity concentrates to be charged directly into steel baths.

The remainder went into tungsten metal powder and other tungsten products to make cemented carbides, electric lamp filaments and other products.

TIN

Past, Future Storm Center

VIOLENT price fluctuations, controls, scarcities and oversupplies mark the past of tin. Probably they will characterize its future as well.

The United States, user of half the world's output, is almost wholly dependent on imports. Tin-bearing ores of this country have been examined periodically and discarded. They are too low-grade to process.

When you think of tin, you think of Malaya, which produces about one-third of the world's total. Malayan production was badly disrupted during the Japanese occupation during World War II and had been slowly climbing back to normal operations. Malaya last year contributed 57,500 long tons toward world output of 174,400 tons. This was the highest production since 1941 when world output hit a record 245,000

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means
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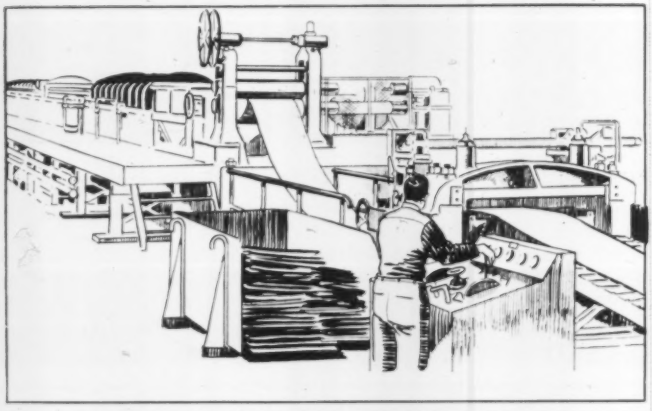
MORE METAL



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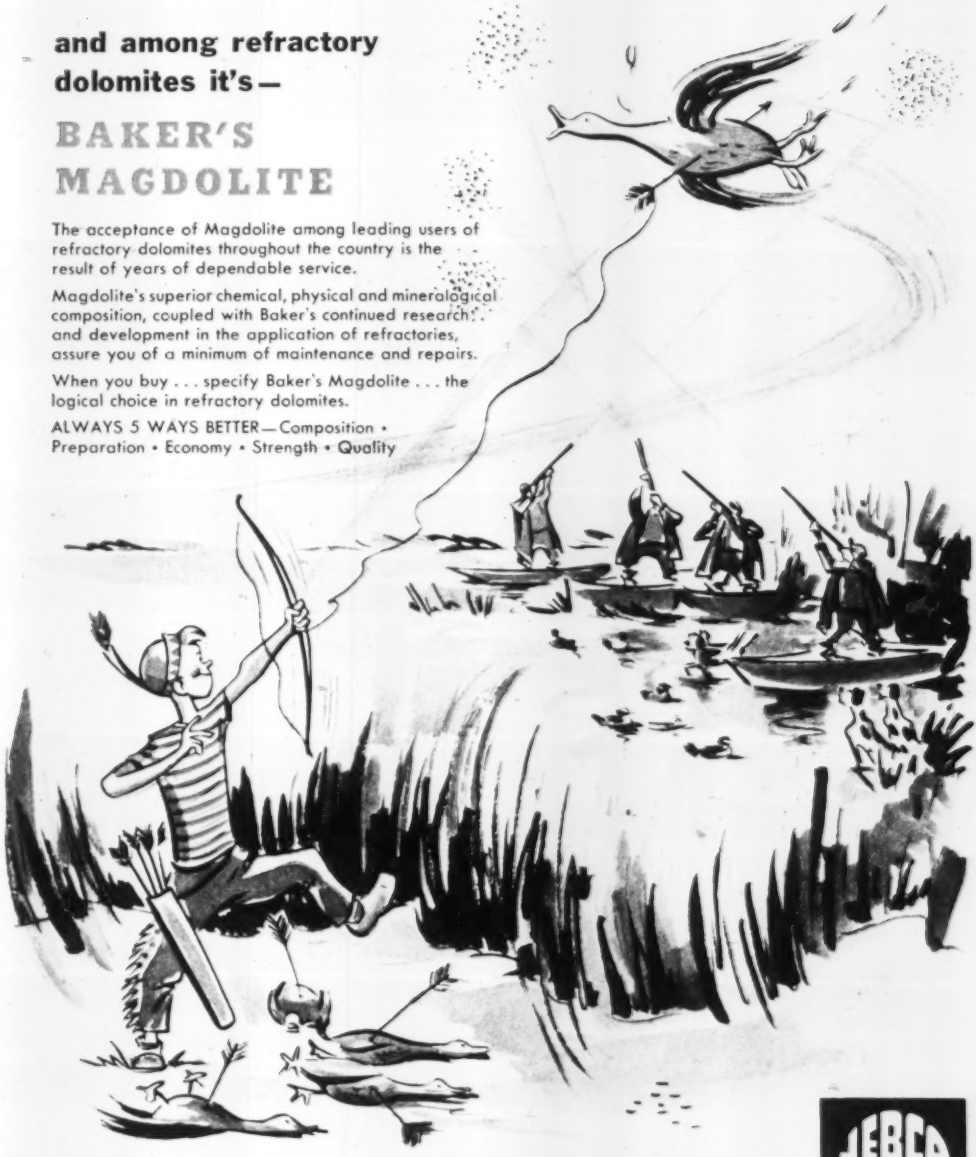

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John C. Richards

John C. Richards,
General Manager of Sales

tons, of which Malaya produced 78,000 tons.

Second largest producer is Indonesia. Third is Bolivia. Each accounts for about one-fifth of world output. Other major producers are in the Far East and in Africa.

Russia claims to be self-sufficient in tin, although production is believed to be no more than 8000 long tons annually.

Prices—World tin prices fluctuated wildly during 1951. Before Korea, the price was fairly stable at around 75 cents a pound. A rise began with the outbreak of hostilities and continued to a peak of $1.83 in February, 1951. Last March, the United States announced it had quit purchasing for stockpiling and concentrated buying in Reconstruction Finance Corp. This helped to drive the price down to $1.03 in September.

Uses—About half the primary tin used in the United States goes into tin plate. Other major uses are for solder, bronze, babbitt, collapsible tubes and foil and for tinning.

CHROMITE

We Depend on Imports

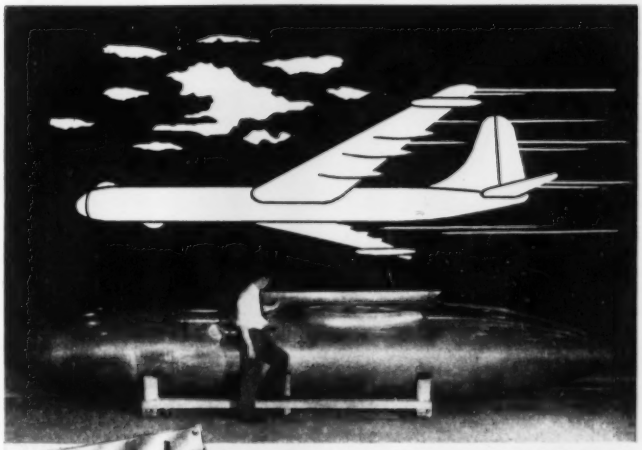
ALTHOUGH chromium is in group II in NPA's basic materials list (indicating supply and demand are in approximate balance) the United States depends almost wholly on imports. Russia is the leading producer and until the last year or two was our leading supplier of metallurgical grades. Turkey and Southern Rhodesia now have assumed greater importance as a supplier of metallurgical grades while the Union of South Africa, the second largest producer, supplies a large proportion of chemical grades and the Philippines and Cuba send us substantial quantities of refractory grades.

Domestic production is reviving slightly but is not overly significant in view of requirements.

Accent on Alloys—Rearmament is causing consumption of metallurgical grades to rise rapidly. About half the chromite used in this country goes into the chrome alloy steels, now needed in larger quantities for defense applications requiring stainless, heat-resistant and corrosion-resistant metals.

Second largest use is for refractory material for lining and repairing furnaces for both ferrous and noferrous metals.

Chemical uses, for pigments, tanning and electroplating, take substantial quantities.

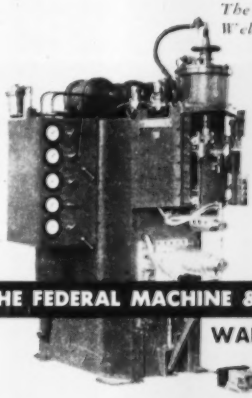


Federal RESISTANCE WELDERS USED IN CONSTRUCTION OF LARGEST KNOWN FUEL TANK

The huge external aircraft fuel tank pictured above is one of a type being produced for the Air Forces by the Ryan Aeronautical Company. Designed by Ryan the tanks are fabricated of aluminum alloys, seam welded to MIL-W-6860 (AN-W-30) on Federal Welders where Ryan is making gas-tight seams without the use of sealing compounds.

Federal Resistance Welding equipment enables Ryan to produce a smoothly streamlined tank that has no external riveting or protuberances to disturb the aerodynamic flow over the skin. Too, resistance welding the tanks eliminates added weight.

High production is another important factor and Ryan, like other aircraft and automotive manufacturers, finds Federal Resistance Welders the most efficient method for producing quality assemblies at high speeds.



The latest Federal Three-Phase Aircraft Spot Welder for welding stainless, aluminum, nickel alloys and carbon steels. If you are interested in Three-Phase Resistance Welding be sure to talk with the Federal Representative in your area. There's a reason why Federal is First in Resistance Welding. Send for your copy of the latest Federal Three-Phase Bulletin.

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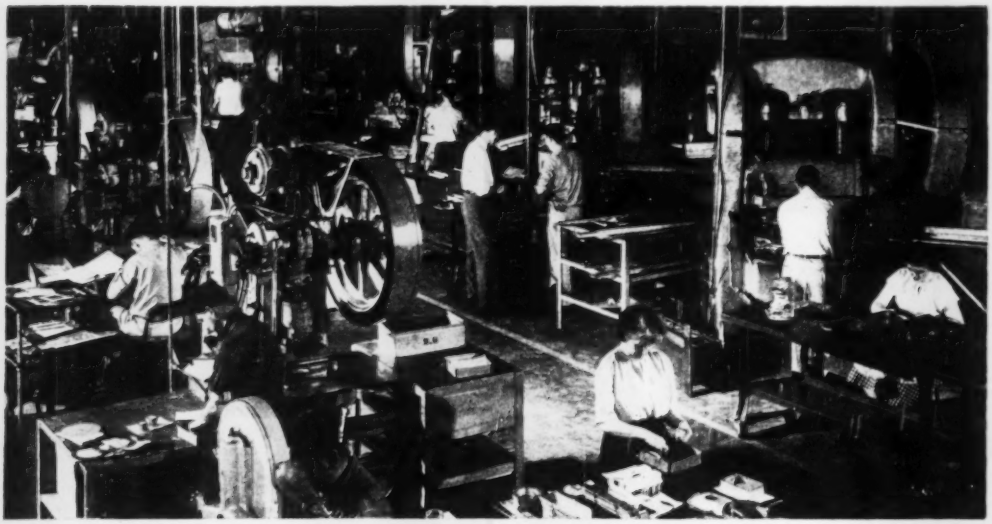
The Production Method is used whenever the cost of very fine dies can be spread over enough pieces to result in a low unit cost. A first-class tool and die shop plus a wide range of efficient presses are our secret of economical production.

A new hope for further reduction in costs is our own newly developed Hecht-type die. Although not yet universally applicable, the low cost, but permanent, Hecht tools are already saving thousands of dollars for our customers by slashing the costs of standard dies.



For LOW TOOL EXPENSE — Our Short Run Method

For runs of lesser quantity where contour and material are suitable, inexpensive temporary-type dies are used to blank contours. Bolt holes and interior diameters are added in separate press operations. Special purpose presses, custom-adapted for this type of work are what make the STAMPINGS DIVISION a strong competitor in this field where original techniques are so important.

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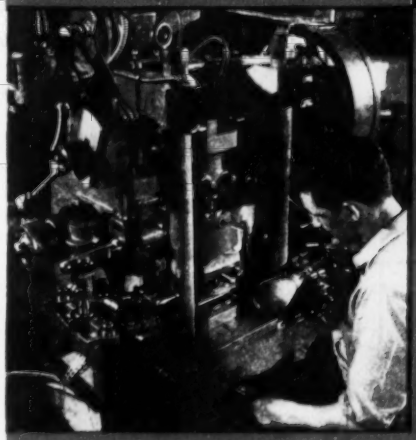

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The economical way to produce from 1-100 parts is our die-less duplication by the Machine-Cut Method, a STAMPINGS DIVISION specialty. Contour sawing, rotary shearing, bending and grinding equipment is used rather than normal stamping equipment. The only dies used are right from our immense stock, on hand for your use. Here is a valuable low cost service on small volume, experimental or pilot orders.

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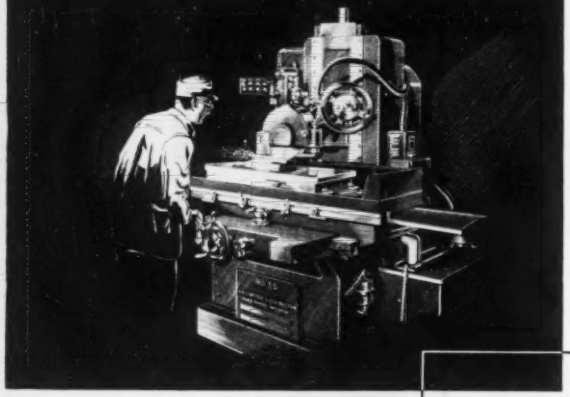

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One World in Metallurgy?

(*Continued from Page* 119)

give added flexibility. Internal sheath circumference is about 5 per cent more than that of conventional three-conductor oil-filled cable, but the difference in internal cross section area is 35 per cent in favor of the flat type, with corresponding reduction in weight. The flat sheath sides give the necessary membrane effect throughout the cable length in order to compensate for the change in oil volume at different loads to avoid the formation of ionized voids in the dielectric.

Austrian Plants Small — No shortage of university-trained metallurgists is being experienced in Austria, according to Hans Reichert of Liesing, Boscham & Co. in Wein, producer and refiner of aluminum alloys and the white metals. Most Austrian plants are small, employing from 100 to 500. Technical talent in past years has tended to gravitate to Germany and other European countries where industry is on a larger scale. However, there are two large continuous rolling mills operated by the former Goering steelworks and the outlook is for a higher volume of production in both nonferrous and ferrous fields. The need for standardization of nomenclature and systems of measure is critical.

Need Magnesium for Alloying—Industry in western Germany has recovered rapidly in the postwar years. Aluminum production, to cite merely one example, is back to a rate of 85,000 tons a year, or about 85 per cent of prewar. Five plants are in the field. A stumbling block is the restriction on production of magnesium for alloying. At present, magnesium aircraft scrap is being used for this purpose, but the supply will be exhausted in a year, when some means for importing the metal will have to be developed. Aluminum goes mainly to such fields as utensils, building architecture and the like. Biggest extrusion press now operated has 5000-ton capacity, the larger wartime units having been dismantled and shipped out of the country. Continuous casting of both aluminum and copper in 4-6-inch round billets by the Junghans process is proceeding apace, according to Paul Brenner, director of research laboratory, Vereinigte Alumimum Werke, Bonn.

Aluminum producers in Japan are also confronted with restrictions on magnesium, although there is a stockpile on hand sufficient for one year's requirements. However, in the opinion of Tukasa Kawamura, head of the manufacturing department, Nik-

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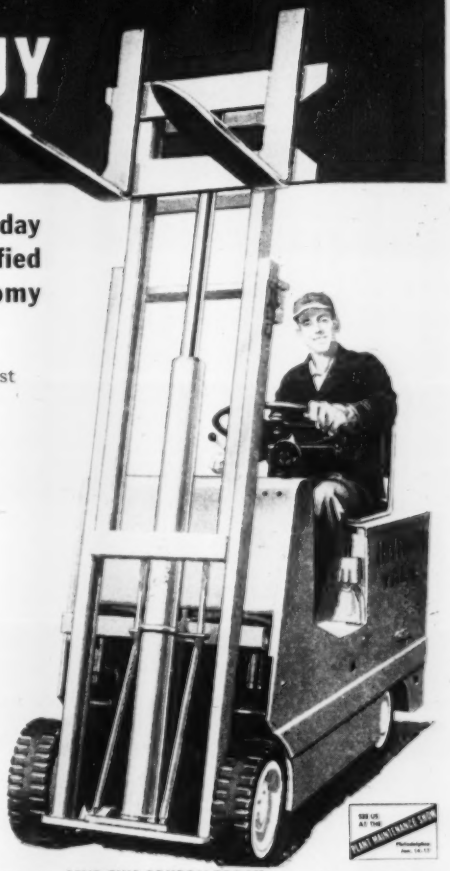

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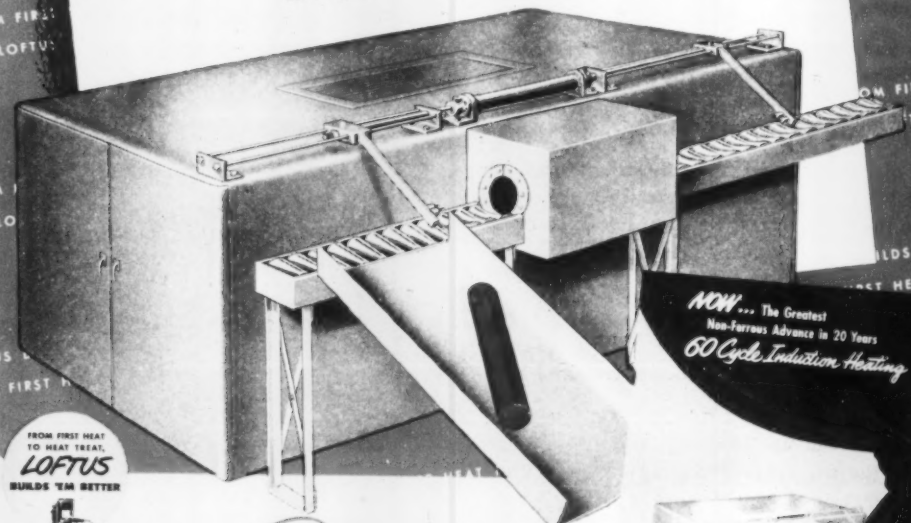

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ko Copper Works, Tochigi-Ken, aluminum producers in his country are faced with costs of bauxite double those of European reduction plants. This, added to the relatively poor condition of equipment, makes export of products like aluminum cable and sheet practically impossible. Industry in Japan has been fairly well rebuilt since 1945, production of automobiles, trucks and tractors being back to a level of 30,000 a year, against perhaps 50,000 prewar.

Japan has always been a center of metallurgical education and training, with its seven large universities attracting a large registration. There are still plenty of students, but a lack of trained instructors and professors to handle them.

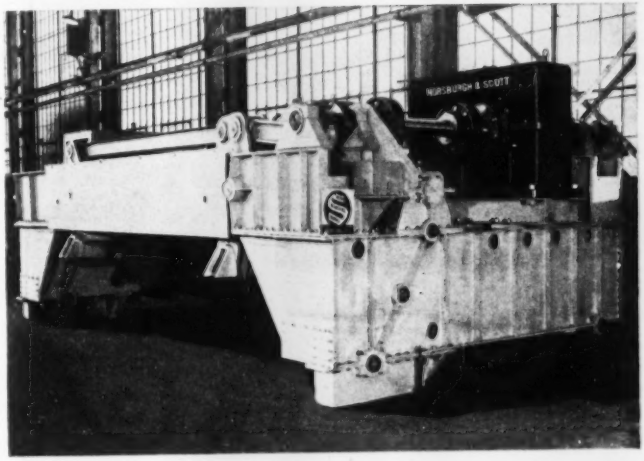
Mines Improved; Labor Unimpressed—Coal is the bottleneck in Australia's expanding iron and steel industry. Despite mechanization of mines, improved housing and working conditions for miners, it continues difficult to persuade working people to take full advantage of the improved equipment. They seem to feel that hard work can result in only another depression, and even the incentive of more pay for more work has little persuasive power. Yet the coal must be had somehow, since there is no oil or gas of any consequence on the continent. A seventh blast furnace of 1500-ton capacity recently has been brought into production, bringing daily output close to 7000 tons. A disturbing fact is that ash content of coking coals has gradually climbed to 10-12 per cent, whereas it used to be around 7 per cent.

Industries "down under" as explained by Dr. Howard Knox Worner, professor of metal'urgy at the University of Melbourne, are classed as primary, secondary and teritary. Primary involves the reduction of ore and the casting of ingot material. Secondary is the working of ingot to semifinished and finished material; teritary is the fabrication of the finished product. About 50 per cent of Australia's gross annual income is secondary industry.

Shipping Tungsten Ores—Export of high-manganese (10-12 per cent) iron ores to the U. S. may be an important new activity, as is the shipment of concentrated scheelite and wolframite ores for reduction of their tungsten content.

There are no aluminum reduction plants in Australia, although there is some continuous casting of ingot received from Canada, along with its rolling into sheets, bars, tubes and related shapes. Large new water power installations are being erected

Giving a lift to 56,000 pounds of



soaking pit cover through . . .

H & S REDUCERS

● The above photograph shows a soaking pit cover crane designed and built by Salem Engineering Company. Two Horsburgh & Scott Helical Speed Reducers are used on each crane...the lift drive handles a cover weighing about 28 tons and operates at a speed of 6′ per minute... the traverse drive moves the crane at a speed of 88′ per minute. Many of these cranes have been operating very satisfactorily for twelve to fifteen years... actual tribute to complete engineering design.

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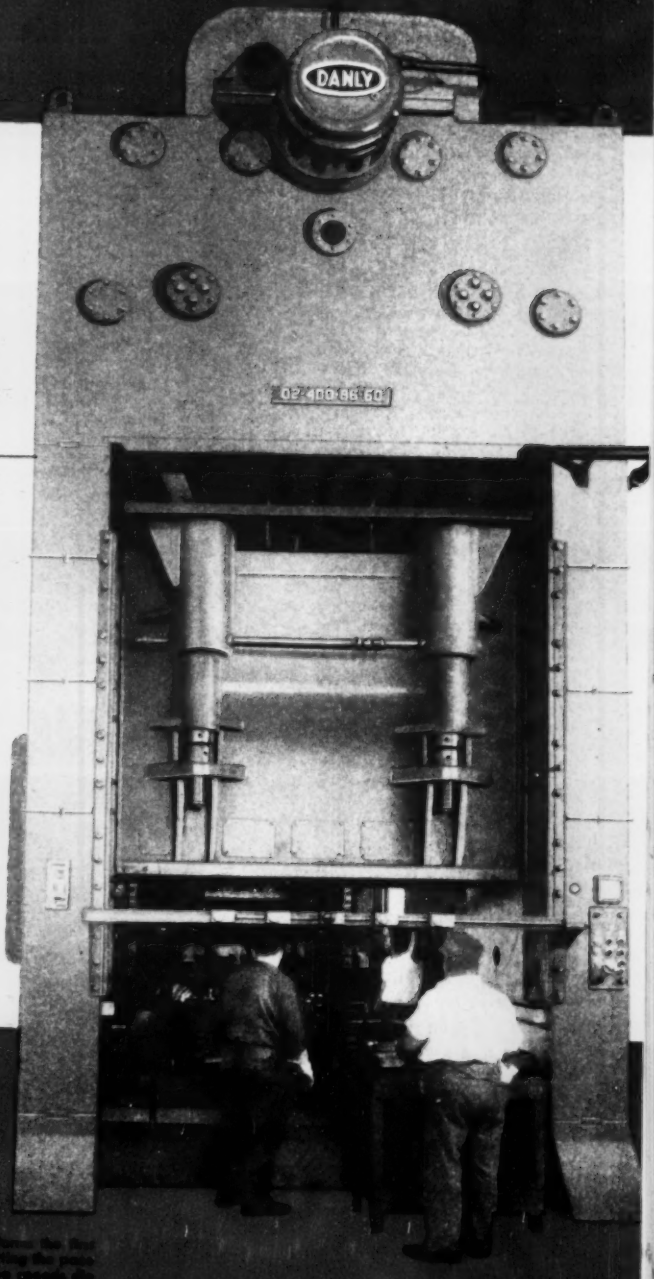

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This 400 ton Danly Double Action Press performs the first drawing operations on a variety of pieces, setting the pace for the entire line. Clear access to the die area speeds die changing.

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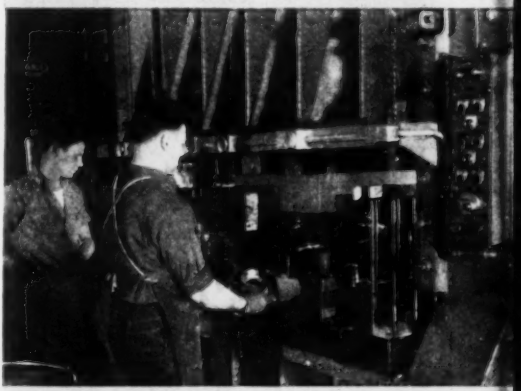
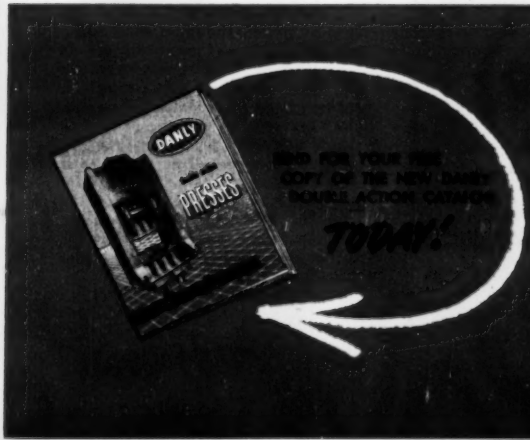
PRODUCTION FLOW . . .
where a sequence of stamping operations is performed continuously on a line, each press is vitally important. Every press in the two lines shown here is a Danly.

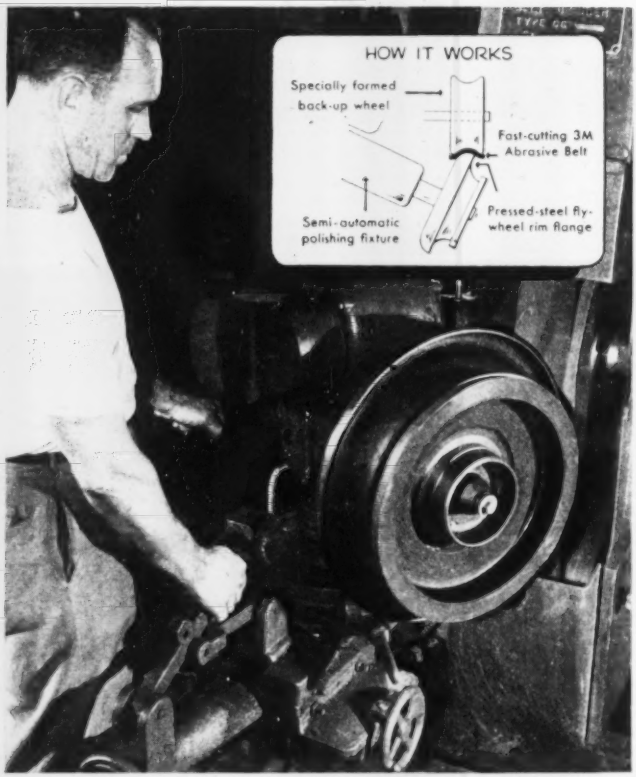


EXTRA SAFETY . . .
Danly Press Controls protect operators and equipment too. Here, two operators independently feed separate dies in the same press with maximum safety. In this setup, it is required that each operator engage two run buttons during most of the down stroke before the press will complete the cycle.



DANLY

IT COSTS LESS TO RUN A DANLY PRESS



SEMI-AUTOMATIC polishing fixture spins and turns 20" pressed-steel wheel against 3M belt. Back-up wheel is formed to mate with curve of flywheel flange.

"Formed-wheel" belt grinding cuts 3-step job to one!

3M ABRASIVES SLASH GRINDING TIME 71% AT AMERICAN TYPE FOUNDERS

Time study figures prove it! Formed back-up wheels and 3M Abrasives are saving American Type Founders $1.15 on every "Little Giant" press flywheel they finish. A one-step operation now gives these wheels a smoother, cleaner surface in only 7¼ minutes instead of 25 minutes with the former 3-step method, saving 71% on time alone.

Diagram above shows how formed back-up wheel matches the contour of the flywheel rim.

You can make savings in time and money on *your* heavy grinding and finishing by consulting one of our experienced Methods Engineers. No obligation! Write Dept. S101 for this 3M consultation service.

Made in U.S.A. by MINNESOTA MINING & MFG. CO., St. Paul 6, Minn., also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Adhesives. General Export: Minn. Mining & Mfg. Co., International Division, 270 Park Avenue, New York 17, N. Y. In Canada: Minnesota Mining & Mfg. Co. of Canada, Ltd., London, Canada.

which will triple electric power output on the continent. While interior areas of the country are largely uncultivated from an industrial standpoint, there is one blast furnace situated in the interior close by a rich ore deposit. Coal has to be brought in by rail, and iron ore is used as ballast on the return trip.

In the tertiary industry group the General Motors Holdens Ltd. automobile project is one of the most spectacular. An assortment of new plants furnishes practically every component going into the car, making it virtually a 100 per cent domestic product. Inflation has taken its toll on the price of the Holden, as in other countries, retail price having mounted from $1100 to $2000.

Friendly Hands Extended — Stack up the foregoing observations and opinions, along with many others too brief to be credited in detail yet often just as significant, and there appears a pattern applying not only to metallurgy in the free world but to all phases of metals production, fabrication and research. It might be highspotted as follows:

1. Universal recognition of the top position of the U. S. in mass manufacturing, coupled with a keen desire to see and study operations in detail.
2. Acknowledgment of the short supply of many metals and alloys, with a somewhat lesser degree of concern than that observed in this country.
3. Willingness to share in what specialized knowledge there may be on the one side with the managerial talent there might be on the other.
4. A more leisurely and at the same time more thorough pace of research in European countries than is the rule here.
5. A consuming desire to be friendly and co-operative, plus an appreciation of the friendship reciprocated by the WMC hosts.

Fuel Systems Described

A compact and comprehensive bulletin is just off the press, illustrating and describing the complete line of McKee-Eclipse burners, mixers, valves and blowers used in gas combustion for industrial purposes. One page is also devoted to gas and oil-fired steam boilers and furnaces for the process industries. This pamphlet is designed to show the wide variety of the company's products, and the range of sizes in which each is obtainable. More detailed bulletins are available on each product, for those interested in specific equipment. Requests should be made direct to Eclipse Fuel Engineering Co., 1190 Buchanan St., Rockford, Ill.

Holding the KEY to---

TOUGH Bending Problems

Experienced manpower and modern methods combine to solve even the most difficult bending problems at King Fifth Wheel.

Perhaps we haven't encountered your particular problem before (chances are we have, because we've heard about most of them since 1904) but we'll make it our business to give you a prompt, helpful answer • Remember this: the key to tough bending problems is *experience.* We've got lots of it and, frankly, we don't know any substitute.

If you'd like a catalog, capacity charts or a representative to call; phone, wire or write Department 10851.

King FIFTH WHEEL COMPANY
2915 N. 2ND ST., PHILADELPHIA 33, PA., NE 4-2444

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it's engineered for special requirements!

Write to our nearest sales office
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Metal Show Exhibitors

(Continued from Page 135)

	Booth No.
Blakeslee & Co., Cicero, Ill.	A250
Boice Crane Co., Toledo	A141
Bowser Inc., Ft. Wayne, Ind.	H416
Brainard Steel Co., Warren, O.	G151
Brown-Hutchinson Iron Works, Detroit	A149
Bruce Products Corp., Detroit	H223
Bruning Co. Inc., Chicago	F426
Brush Development Co., Cleveland	B147
Buck Tool Co., Kalamazoo, Mich.	C224
Buehler Ltd., Chicago	B131
Bundy Tubing Co., Detroit	D202
Cadillac Stamp Co., Detroit	H258
Cambridge Wire Cloth Co., Cambridge, Md.	C111
Carboloy Dept., General Electric Co., Detroit	F214
Casting Engineers Inc., Chicago	H324
Chicago Metal Hose Corp., Maywood, Ill.	C218
Chicago Rivet & Machine Co., Bellwood, Ill.	G214
Chicago Tramrail Corp., Chicago	H215
Chilton Co. Inc., New York	A256 & A138
Chrysler Corp., Detroit	G416
Cincinnati Milling Machine Co., Cincinnati	G356
Cities Service Oil Co., New York	D210
Clark Instrument Inc., Dearborn, Mich.	B143
Climax Molybdenum Co., New York	D250
Clinton Machine Co., Detroit	H546
Coast Metals Inc., Canton, O.	H426
Coles Cranes Inc., Chicago	F307
Commander Mfg. Co., Chicago	A159
Commercial Shearing & Stamping Co., Youngstown	D321
Commercial Steel Treating Corp., Detroit	D310
Composite Die Supply Co., Detroit	D112
Congress International des Fabrications Mecaniques	H519
Connors & Davis Sales Corp., W. Springfield, Mass.	H423
Continental Industrial Engineers Inc., Chicago	H345
Continuous Metalcast Corp., New York	G459
Crane Packing Co., Chicago	D242
Cro-Plate Co. Inc., Hartford, Conn.	G122
Crucible Steel Co. of America, New York	G310
Dake Engine Co., Grand Haven, Mich.	F416
Deepfreeze Distributing Corp., N. Chicago, Ill.	H254
Delaware Tool Steel Corp., Wilmington, Del.	C211
Delta Power Tool Div., Milwaukee	A319
Detrex Corp., Detroit	G351
Detroit Edison Co., Detroit	F461
Detroit Electric Furnace Div., Bay City, Mich.	A260
Detroit Stamping Co., Detroit	H306
Detroit Testing Machine Co., Detroit	B127
Diamond Iron Works Inc., Minneapolis	H236
Dietert Co., Harry W., Detroit	B244
Distillation Products Industries, Rochester, N. Y.	D236
Diversey Corp., Chicago	G346
Diversified Metal Products Co., Los Angeles	H224
DoAll Co., Des Plaines, Ill.	H305 & H406
Dow Chemical Co., Midland, Mich.	F222
Dow Furnace Co., Detroit	A349
Drever Co., Philadelphia	C229
Driver Co., Wilbur B., Newark, N. J.	A305
Du Pont de Nemours & Co., E. I., Wilmington, Del.	F356
East Shore Machine Co., Cleveland	H111
Eastman Kodak Co., Rochester, N. Y.	D236

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When KINNEAR DOORS Roll Up

They save SPACE — by opening straight up and coiling above the doorway, allowing floor and wall space around the door to be used at all times.

They save TIME — with smooth, easy gliding action. With motor operation, doors can be motor controlled from any number of conveniently located push-buttons.

They save MONEY — rugged, all-steel, interlocking slat curtain assures long life, low maintenance, and extra protection against fire, intrusion and wind damage.

Every Kinnear door is specially fitted to the individual opening, in old or new buildings. Cannot interfere with traffic or other plant activity. When opened, it stays neatly above lintel, out of reach of damage. The Kinnear door's capacity for years of hard, uninterrupted use under the most difficult conditions has been proved by a half century of service.

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KINNEAR ROLLING DOORS

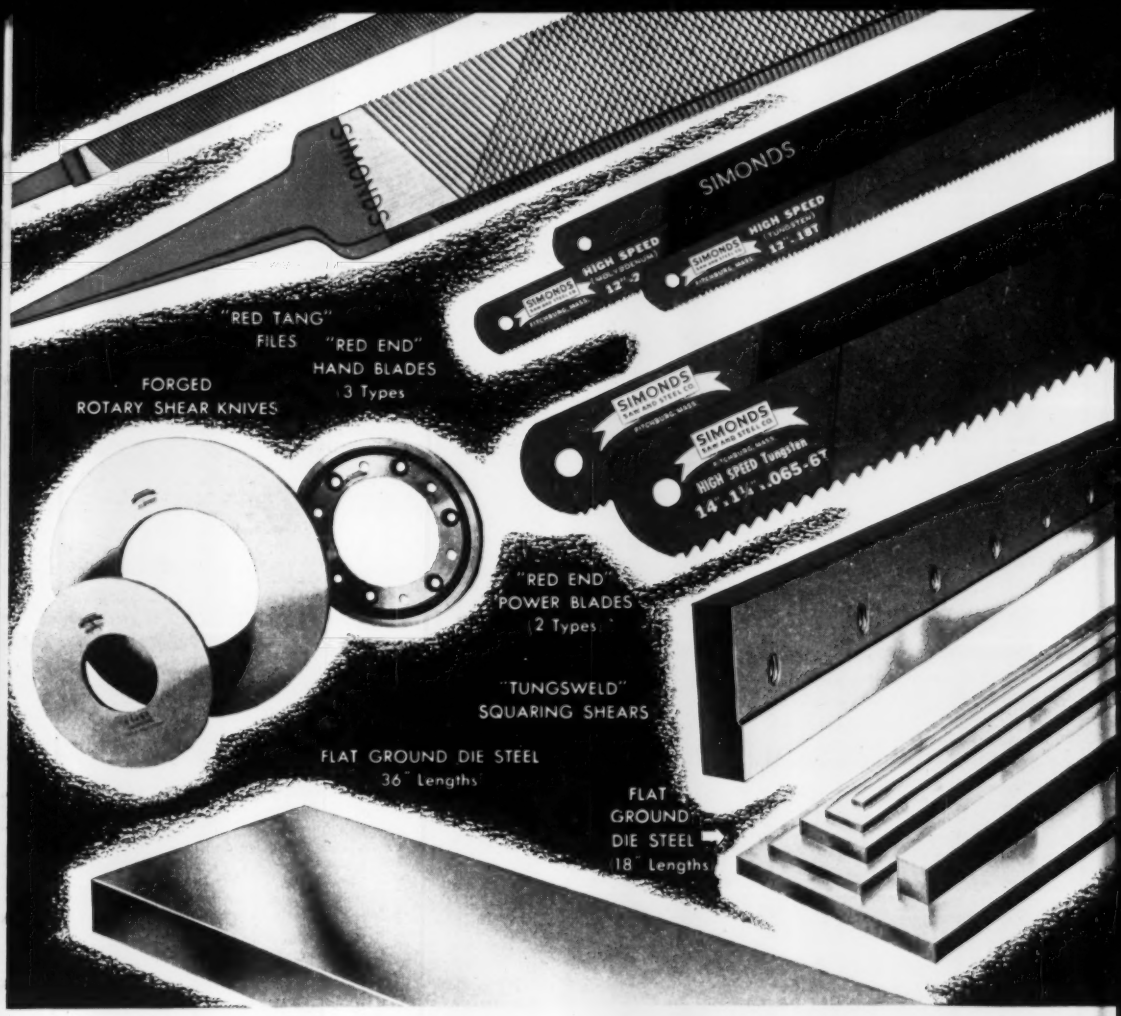
If You Cut Metal CUT MORE with SIMONDS Industrial Line

Over 100 years devoted to the ideal of developing the foremost line of cutting tools in this country . . . that's what underwrites every purchase you make of any product in the Simonds Line.

And don't forget this: You get 100% Simonds Quality Control . . . beginning with steels processed *for your job* from Simonds own steel mills . . . and going all the way through Simonds famous Windowless Plant (first in this country).

Here, in this completely controlled-conditions plant, modern straight-line production methods are

The Simonds Line is



implemented by special equipment to produce cutting tools of *one quality only* . . . Simonds TOP Quality.

And you can bank on it that these Simonds Tools will deliver top performance on *any* job . . . from hand filing and hacksawing, to production machine cutting with saws of all types and sizes. So, if low-cost and high-level production are vital to you . . . then specify "Simonds" to your distributor or dealer on any requirement you may have on which the tools shown above will serve.

Remember: *You start to save, the minute you say SIMONDS!*

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because of these plus features!

- Steel Plate Housing
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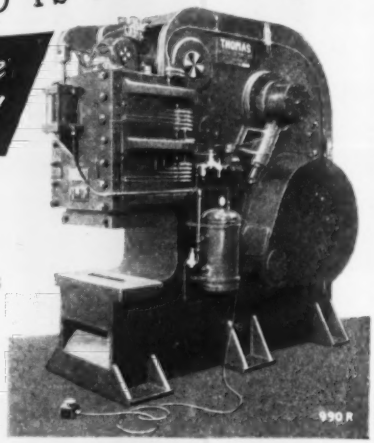

This Thomas All-Steel Punch or Shear has shearing or punching attachments which may be interchanged in a matter of minutes

For rounds, squares, flats, angles or channels

THOMAS
MACHINE MANUFACTURING COMPANY
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PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

Since 1887

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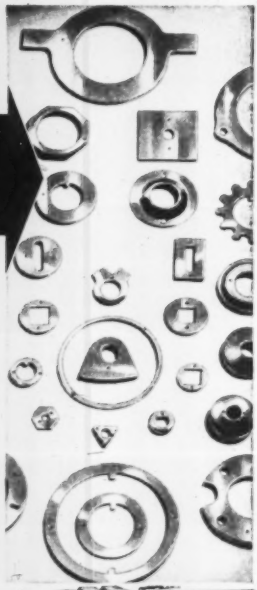

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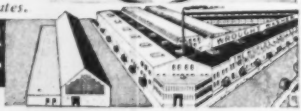
Large volume production, the most advanced methods and facilities, plus more than 60 years of continuous experience in the manufacture of Washers, are factors that enable us to offer you top quality washers and stampings at competitive costs. Over 22,000 sets of dies for making Washers of every type (Standard and Special), from every type of material, for every purpose, in any finish. STAMPINGS of all descriptions; Blanking, Forming, Drawing. *Submit your blueprints and quantity requirements for estimates.*



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Eldorado Mining & Refining Ltd., Ottawa, Canada	H118
Electric Furnace Co., Salem, O.	F405
Electric Products Co., Cleveland	H202
Electro Arc Mfg. Co., Detroit	H508
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Elox Corp., Clawson, Mich.	G239
Empire Products, Inc., Cincinnati	H520
Engelhard Industries, Newark, N. J.	A363
Engis Equip. Co., Chicago	B223
Ercona Corp., New York	B243
Erico Products Inc., Cleveland	H158
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Fahralloy Co., Harvey, Ill.	H151
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Ferner Co. Inc., R.Y., Boston	B218
Firth-Sterling Steel & Carbide Corp., Pittsburgh	G446
Fiske Brothers Refining Co., Newark, N. J.	C232
Freedom-Valvoline Oil Co., Freedom, Pa.	H244
Frontier Bronze Corp., Niagara Falls, N. Y.	B203
Galileo Corp. of America, Inc., New York	B138
Gas Appliance Service Inc., Chicago	G158
Gehringer & Forsyth, Detroit	D140
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General Aniline & Film Corp., New York	G451
General Controls Co., Glendale, Calif.	G164
General Electric Co., Schenectady, N. Y.	A102
General Electric X-Ray Corp., Milwaukee	F250
General Plate Co., Attleboro, Mass.	D109
Goodrich Co., B. F., Akron	C212
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Graham Mfg. Corp., Ferndale, Mich.	H257
Gray-Grimes Tool Co., Detroit	H154
Gulf Oil Corp., Pittsburgh	D230
H. & H. Research Co., Detroit	A205
H. & H. Tube & Mfg. Co., Detroit	D314
Hammond Machinery Builders Inc., Kalamazoo, Mich.	F211
Hanchett Magna-Lock Corp., Big Rapids, Mich.	H120
Handy & Harman, New York	F315
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Heli-Coil Corp., Danbury, Conn.	A154
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Hilger, Ltd., Adam, London	B146
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in one year
with ROTARY AIR
IMPACTOOLS

Shown here are representative sizes from the complete line of I-R Air Impactools designed to meet all nut-running requirements.

A mid-western manufacturer of materials handling equipment saved $10,000 in one year by installing Ingersoll-Rand Air Impactools on an idler assembly nut running job in his plant. The installation of the Impactools and accessory equipment cost $1200, which quickly paid for itself in 33 days!

Similar time and labor savings can be made in your plant, on your jobs. Air Impactools are available in thirteen sizes to handle nut running jobs up to 4" bolt size. The smallest Impactool, for work up to 7/32" bolt size, weighs only 1⅜ pounds; the twelve larger sizes are correspondingly packed with top power per pound.

You get no tiring and wasteful kick or twist with an Impactool . . . full power is delivered to the work . . . quickly running up or removing nuts and screws. Ingersoll-Rand, *originator of Impactools*, has manufactured these sturdy and reliable machines for 18 years. Today they are in use in thousands of plants around the world, saving countless dollars and hours. Call, write, or wire your Ingersoll-Rand branch office—an Air Power Specialist will be glad to give you complete details, or arrange an eye-opening, dollar-saving trial or demonstration in *your* plant.

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COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO-BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL & GAS ENGINES

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SERVICING YOUR LIGHTS!

GIRAFFE: I'll report this to the S.P.C.A.! My contract says I'm an entertainer, not an extension ladder!

MAINTENANCE MAN: Now don't get excited! You can go back to the circus after I clean these lights.

Well why the S#@%*¢ don't you install THOMPSON HANGERS? Then you could clean these lights at floor level whenever necessary.

Thompson Hangers? Whadda they do?

They lower overhead lights to floor level for servicing. What's more, they completely eliminate all climbing and electrical hazards and cut maintenance costs to a minimum!

S-a-a-a-a-y, that sounds terrific! Are they complicated . . . hard to operate?

The THOMPSON HANGER is simplicity itself! All up-and-down movement is controlled by a chain or cable that's part of the installation, and the hanger automatically repositions itself when raised. The live electrical contacts stay at the top. It's safe and foolproof!

Where can we get more details on these Thompson Hangers?

Write to The Thompson Electric Co. and ask for CATALOG No. 50. It will give you the complete story. Now slide down, chum, and turn me loose!

In traveling with The Big Top, the giraffe has seen many THOMPSON HANGER installations, and he has learned that in each (1) maintenance costs are down to absolute minimum, (2) lighting service men have top safety records and (3) all lights are operating at peak efficiency to facilitate round-the-clock production operations.

Write today for your copy of CATALOG No. 50. There's no obligation.

CATALOG No. 50 describes THOMPSON HANGERS and accessory items in detail

1. DISCONNECT 2. LOWER 3. SERVICE 4. REPOSITION 5. REPEAT

THE THOMPSON ELECTRIC CO.

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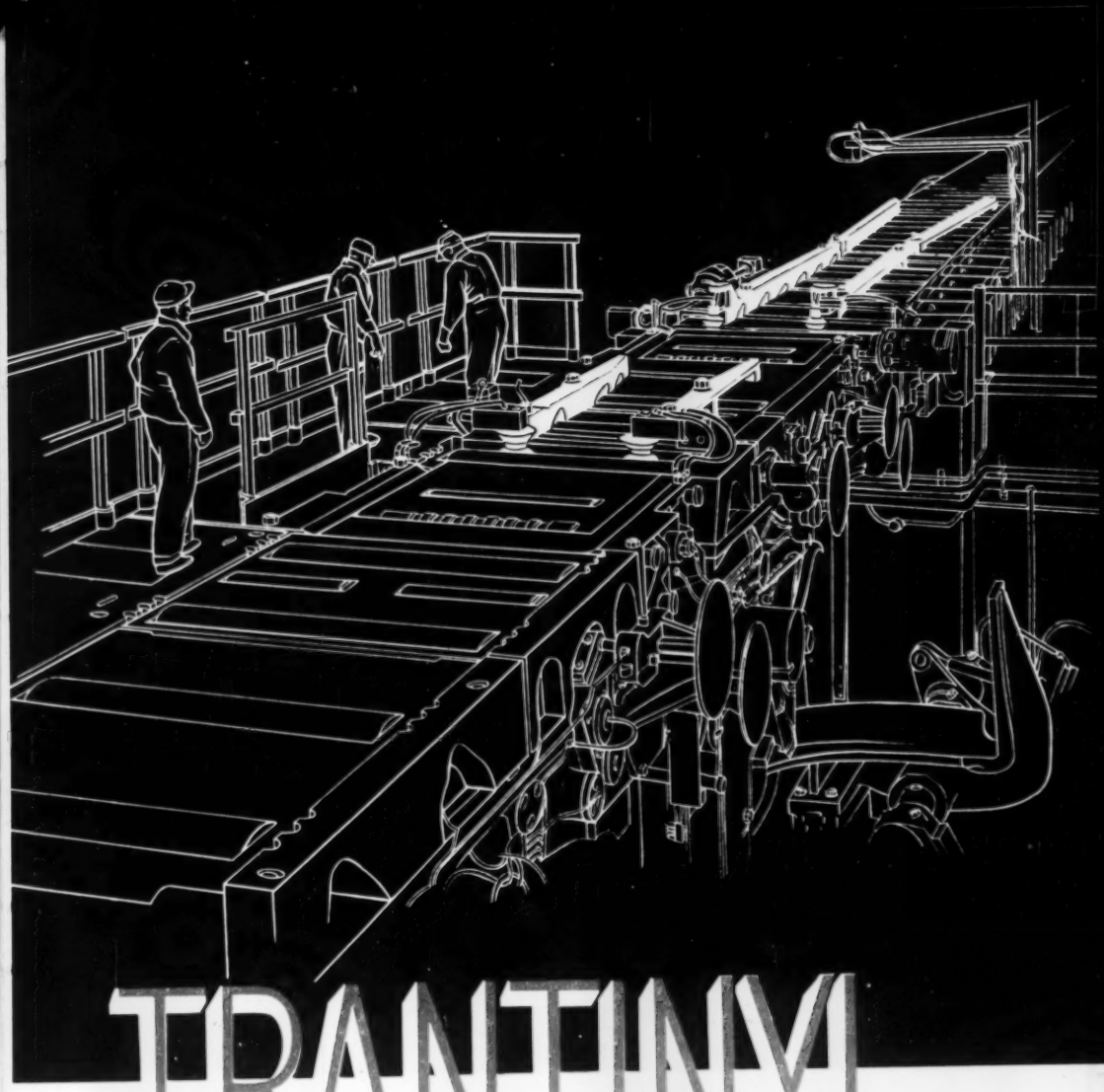

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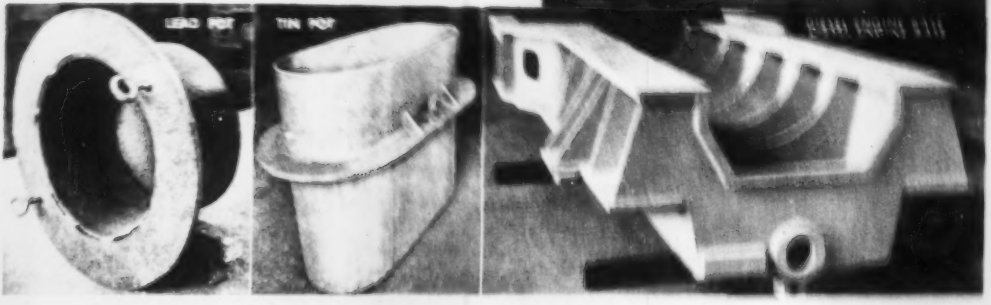

	Booth No.
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Oakite Products Inc., New York	D309
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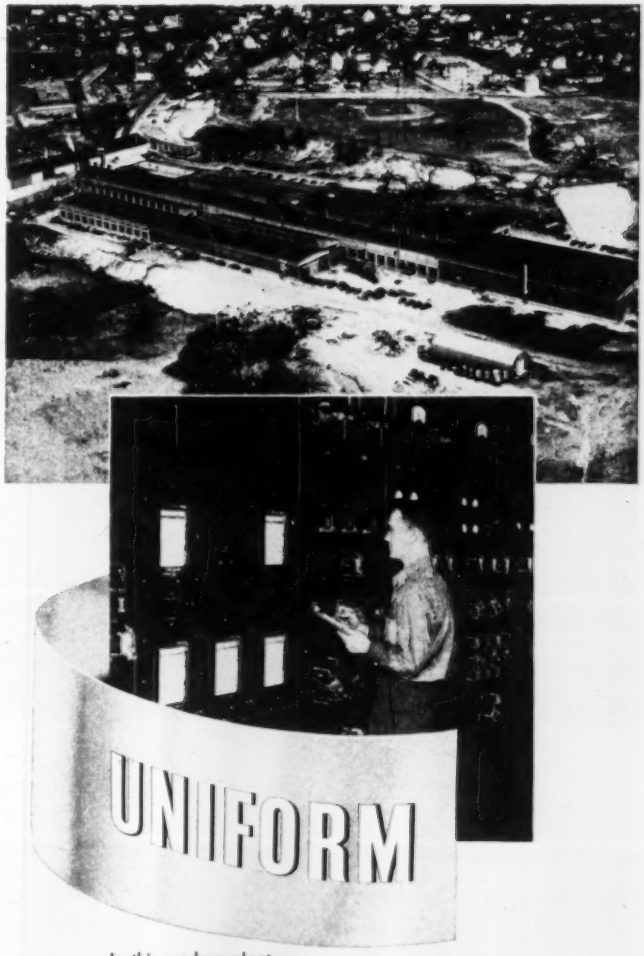

In this modern plant skilled craftsmen, modern equipment and scientific controls all combine forces to produce strip steel of consistently uniform quality. Wallingford uniformity means that gage, temper and surface are in all ways and at all times the same. Edges are always smooth and straight, surfaces uniformly clean and flat, widths consistently exact. This uniform quality means savings in preparation time and smoother, faster operation to cut down machine stoppages and minimize rejects.

THE WALLINGFORD STEEL CO.

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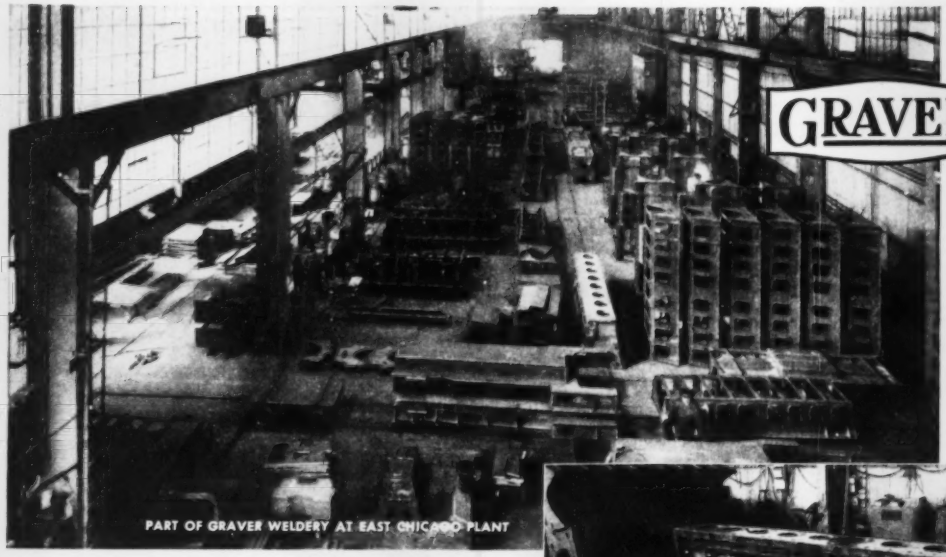
ALLOY • STAINLESS • STRIP and TUBING



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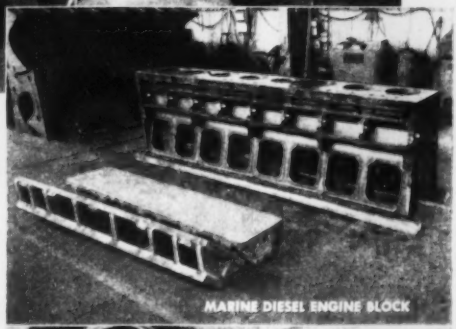

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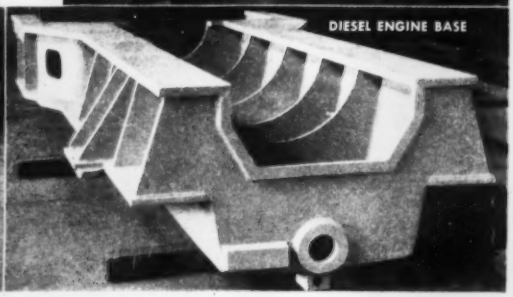
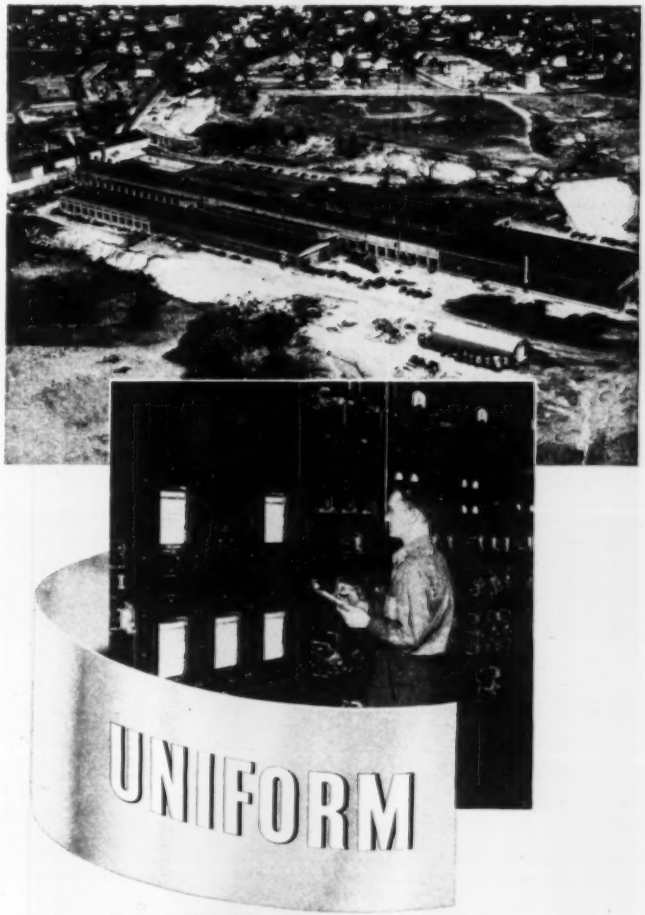


DIESEL ENGINE BASE

	Booth No.
Metals & Controls Corp., Attleboro, Mass.	D109
Metals Finishing Corp., Hazel Park, Mich.	H526
Michiana Products Corp., Michigan City, Indiana	A312
Michigan Bell Telephone Co., Detroit	F401
Michigan Industrial Gas Corp., Detroit	H210
Michigan Steel Casting Co., Detroit	G409
Miller & Taylor Tool Co., Cleveland	G456
Milne & Co., A., New York	A356
Mir-O-Col Alloy Co. Inc., Los Angeles	A316
Modernair Corp., San Leandro, Calif.	H315
Morton Gregory Corp., Toledo, O.	G202
Mueller Brass Co., Port Huron, Mich.	H241
Multifinish Mfg. Co., Detroit	H247
National Cored Forgings Co. Inc., S. Norwalk, Conn.	F254
National Cylinder Gas Co., Chicago	G112
National Diamond Laboratory, New York	C210
National Industrial Publishing Co., Pittsburgh	C239
National Lead Co., New York	F449
National Radiator Co., Johnstown, Pa.	H109
National Research Corp., Cambridge, Mass.	A309
National Spectrographic Laboratories, Cleveland	B146
National Time & Signal Corp., Detroit	B238
National Torch Tip Co., Pittsburgh	H148
Nelson Stud Welding Division, Lorain, O.	G202
New Hermes Engraving Machine Corp., New York	H108
New Jersey Zinc Co., New York	A162
Niagara Blower Co., New York	G422
North American Philips Co. Inc., New York	A220
Nox-Rust Chemical Corp., Chicago	H417
Oakite Products Inc., New York	D309
Office Technique Pour L'Utilisation De L'Acier, Paris, France	H521
Ohio Crankshaft Co., Cleveland	G246
Ohio Overall Cleaning Co., Cleveland	D303
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.	D216
Opplen Co., New York	B138
Osborn Mfg. Co., Cleveland	D118
Ozalid Division, Johnson City, N.Y.	G451
Pangborn Corp., Hagerstown, Md.	G421
Park Chemical Co., Detroit	F456
Parker Rust Proof Co., Detroit	H339
Peabody Industries, New York	H214
Penton Publishing Co., Cleveland	G340
Peters-Dalton Co., Detroit	G355
Phillips Mfg. Co., Chicago	A355
Physicists Research Co., Ann Arbor, Mich.	D135
Picker X-Ray Corp., New York	F411
Powdered Metal Products Corp. of America, Franklin Park, Ill.	A118
Power Ball Oil Co. of Michigan Inc., Detroit	A105
Precision Metalsmiths Inc., Cleveland	B123
Precision Spring Corp., Detroit	A214
Precision Welder & Machine Co., Cincinnati	H364
Product Engineering & Mfg. Corp., Bridgman, Mich.	H221
Production Machine Co., Greenfield, Mass.	F225
Pyrometer Instrument Co. Inc., Bergenfield, N.J.	B108
RCS Tool Sales Corp., Joliet, Ill.	H316
Radio Corp. of America, Camden, N.J.	D324
Ransburg Electro-Coating Corp., Indianapolis	G445
Rapids-Standard Co., Grand Rapids, Mich.	H121



In this modern plant skilled craftsmen, modern equipment and scientific controls all combine forces to produce strip steel of consistently uniform quality. Wallingford uniformity means that gage, temper and surface are in all ways and at all times the same. Edges are always smooth and straight, surfaces uniformly clean and flat, widths consistently exact. This uniform quality means savings in preparation time and smoother, faster operation to cut down machine stoppages and minimize rejects.

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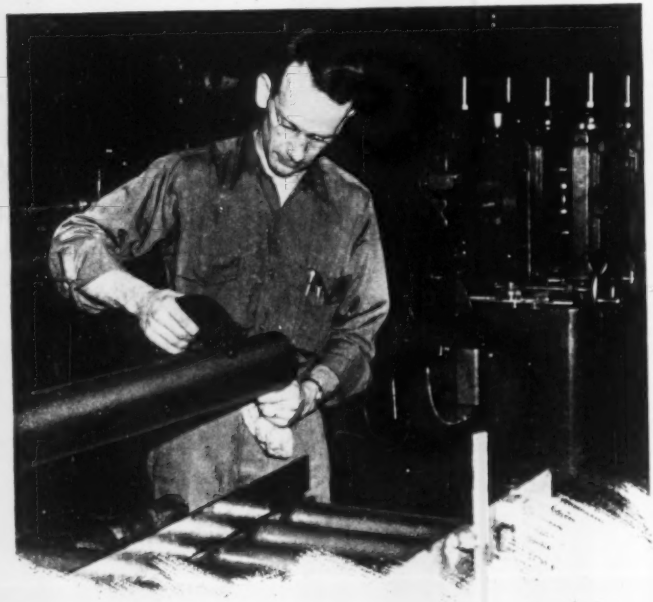
	Booth No.
Raytheon Mfg. Co., Waltham, Mass.	A255
Ready-Power Co., Detroit	G131
Reeves Pulley Co., Columbus, Ind.	A350
Reliance Electric & Engineering Co., Cleveland	A360
Reynolds Metals Co., Louisville	F325
Richards Co., J. A., Kalamazoo, Mich.	H152
Riehle Testing Machines Div., East Moline, Ill.	B246
Robotron Corp., Detroit	H535
Rockwell Mfg. Co., Milwaukee	A319
Rolock Inc., Fairfield, Conn.	D140
Ross Operating Valve Co., Detroit	B232
Safety Clothing & Equipment Co., Cleveland	G462
Sales Service Machine Tool Co., St. Paul	A219
S. & S. Machinery Co., Brooklyn, N.Y.	G330
Schenck, Carl, Darmstadt, Germany	B218
Schrader's Son, A., Brooklyn, N.Y.	G309
Sciaky Bros., Inc., Chicago	G318
Scott Inc., C. U. & Son, Rock Island, Ill.	H243
Scovill Mfg. Co., Waterbury, Conn.	G459
Seal-Peel Inc., Van Dyke, Mich.	A320
Selas Corp. of America, Philadelphia	G148
Sentry Co., Foxboro, Mass.	A109
Service Diamond Tool Co., Ferndale, Mich.	G117
Sheldon Machine Co. Inc., Chicago	A155
Sinclair Refining Co., Chicago	H358
Smith Corp., A. O., Milwaukee	H524
Smith Welding Equipment Corp., Minneapolis	A208
Socony-Vacuum Oil Co. Inc., New York	G221
Solventol Chemical Products Inc., Detroit	A202
Sonoflux Corp., Houston	H146
Sparkler Mfg. Co., Mundelein, Ill.	A218
Special Libraries Association—Metals Section	H424
Spencer Turbine Co., Hartford, Conn.	G260
Sperry Corp., New York G109 &	D115
Standard Alloy Co., Cleveland	D140
Standard American Engineering Co., Lyons, Ill.	D110
Standard Diemakers Supplies, Detroit	H328
Standard Electrical Tool Co., Cincinnati	G210
Standard Oil Co. of Indiana, Chicago	D130
Standard Steel Treating Co., Detroit	H139
Standard Tube Co., Detroit	A216
Starrett Co., L. S., Athol, Mass.	C123
Steel City Testing Machines Inc., Detroit	G220
Stevens Inc., Frederic B., Detroit	D330
Stokes Machine Co., F. J., Philadelphia	A158
Stone Machinery Co., Syracuse, N.Y.	A359
Stuart Oil Co., Ltd., D. A., Chicago	A266
Sunbeam Corp., Chicago	F256
Surface Combustion Corp., Toledo, O.	F240
Syntron Co., Homer City, Pa.	H135
Tempil Corp., New York	C117
Tennant Co., G. H., Minneapolis	H530
Texas Co., New York	C103
Tincher Products Co., Sycamore, Ill.	C228
Tinnerman Products Inc., Cleveland	C207
Tin Research Institute Inc., Columbus, O.	B236
Tracerlab Inc., Boston	B118
Trent Tube Co., E. Troy, Wis.	G310
Trerice Co., H. O., Detroit	B245
Tri-Clover Machine Co., Kenosha, Wis.	H346
Uddeholm Co. of America, New York	B116
Udylite Corp., Detroit	D330
Union Carbide & Carbon Corp., New York	F440
United Chromium Inc., New York	B132
U. S. Air Force—Materials Research, Dayton, O.	H136
U. S. Electrical Motors Inc., Los Angeles	D302
U. S. Gypsum Co., Chicago	H143
Universal Castings Corp., Chicago	G115
Universal-Cyclops Steel Corp., Bridgeville, Pa.	F247
Univertical Machine Co., Detroit	H348
Upton Electric Furnace Co., Detroit	C102
Vanadium-Alloys Steel Co., Latrobe, Pa.	D345
Vapofier Corp., Chicago	C109
Vickers Inc., Detroit	G109
Vlier Mfg. Co., Los Angeles	B204
Walder-Scott Inc., Detroit	G101
Walker-Turner Div., Plainfield, N.J.	A240
Wall Colmonoy Corp., Detroit	C243
Webber Appliance Co. Inc., Indianapolis	H248
Weldit Inc., Detroit	H545
Wells Mfg. Co., Three Rivers, Mich.	D209
Wells, W. F. & Sons, Three Rivers, Mich.	H117
Weltronic Co., Detroit	D224
Western Sealant of Detroit Inc., Detroit	C118
Westinghouse Electric Corp., Pittsburgh	G430
Weston Electrical Instrument Co., Newark, N.J.	B227
Wheelco Instruments Co., Chicago	D219
Wilson Carbon Co., New York	B220
World Raw Materials Congress	H519
Worthington Pump & Machinery Co., Harrison, N.J.	G455
Wynn Oil Co., Milford, Mich.	H124

HOW TUBING TOLERANCES ARE CHECKED AT BRAINARD...



OUTSIDE DIAMETER. INSIDE DIAMETER. gage, ovality, straightness—all tolerances are checked over and over again at Brainard to make sure sizes are perfect for the job ahead. Every order, large or small, gets the careful supervision of Brainard craftsmen—we have complete control of every operation from ore to tube. That's why it will pay you to call on Brainard first when you have a job for electric welded mechanical tubing. Straight or fabricated. Sizes ½" to 4"—.025 to .165.

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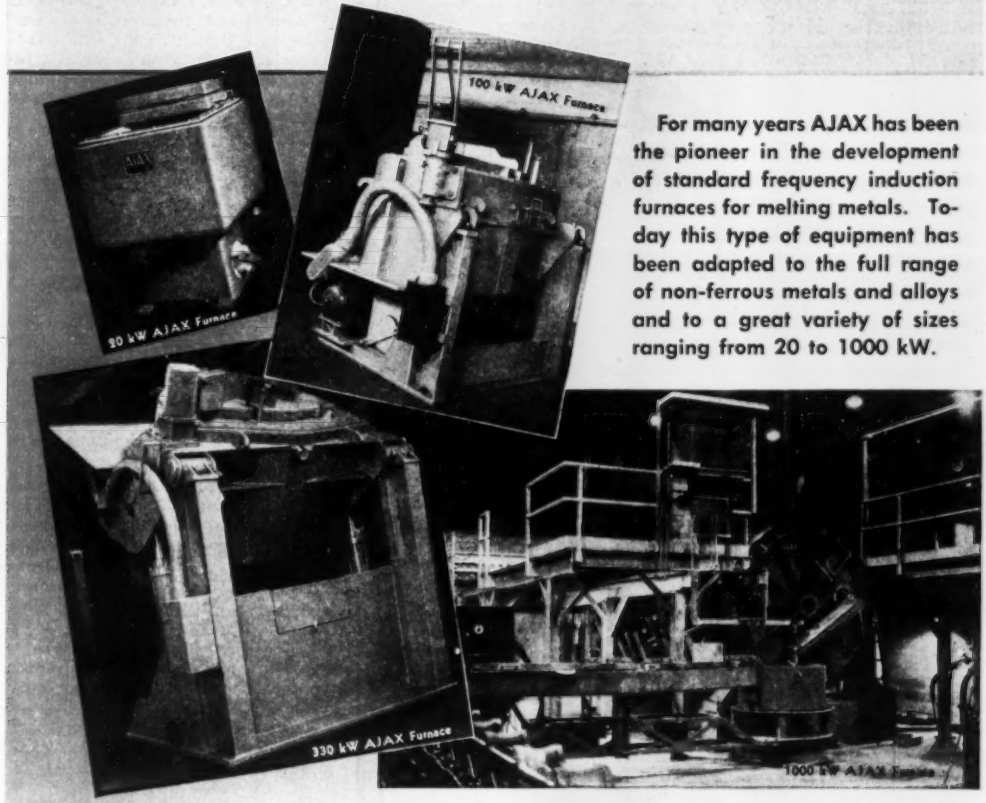
Yes! AJAX Induction Melting Furnaces are Versatile!



For many years AJAX has been the pioneer in the development of standard frequency induction furnaces for melting metals. Today this type of equipment has been adapted to the full range of non-ferrous metals and alloys and to a great variety of sizes ranging from 20 to 1000 kW.

AJAX Induction Melting Furnaces are now used for the following applications: Die Castings, Permanent Mold Castings, Sand Castings, Billets for Rolling and Extrusion, Recovery of Scrap, Galvanizing and Aluminizing of Steel and many others.

For special applications an Automatic Electromagnetic Pump allows continuous feeding of molten metal into the molds as they move past. Hand ladling is eliminated. Temperature of course is also automatically controlled and there is no chance of overheating the bath at any time during the melting cycle.

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Jet blades cleaned and rust protected in one spray washer

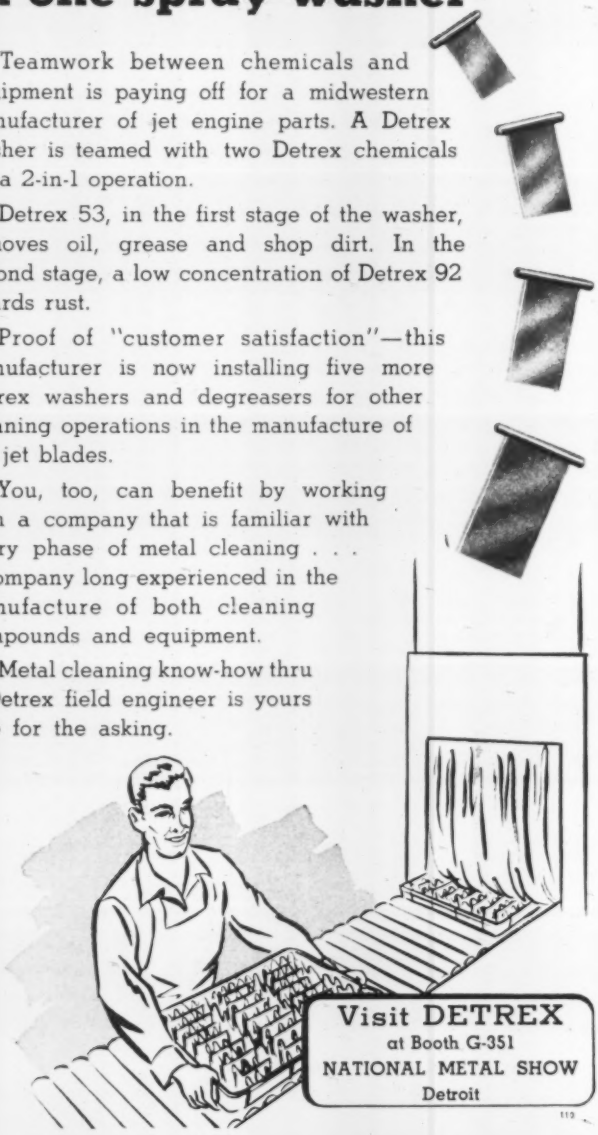
Teamwork between chemicals and equipment is paying off for a midwestern manufacturer of jet engine parts. A Detrex washer is teamed with two Detrex chemicals for a 2-in-1 operation.

Detrex 53, in the first stage of the washer, removes oil, grease and shop dirt. In the second stage, a low concentration of Detrex 92 retards rust.

Proof of "customer satisfaction"—this manufacturer is now installing five more Detrex washers and degreasers for other cleaning operations in the manufacture of the jet blades.

You, too, can benefit by working with a company that is familiar with every phase of metal cleaning . . . a company long experienced in the manufacture of both cleaning compounds and equipment.

Metal cleaning know-how thru a Detrex field engineer is yours free for the asking.



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Technical Advances Revealed at AISE Meeting

TECHNICAL papers presented at the annual convention of the Association of Iron & Steel Engineers, Hotel Sherman, Chicago, Oct. 1-4, offer a well-rounded coverage of the latest developments in the iron and steel industry. The four-day program with morning and afternoon sessions dealing with electrical units, combustion, mechanics, operating practice, standardization and lubrication incorporates a total of 42 subjects. A digest of some of the papers follows.

Combustion Gas Turbines and the Steel Industry, by W. B. Wilson, application engineer, Industrial Power Division, General Electric Co., Schenectady, N. Y.

The combustion gas turbine is an important new tool for the power engineer in the iron and steel industry. This industry is a large user of electric power and often supplements power purchased from the utility with power generated within the mill. Power generation within the mill becomes more attractive, of course, when low-cost by-product fuel can be utilized.

Simplicity, low first cost and expected low maintenance and operating costs of combustion gas turbines make them applicable in many mills where power generation is considered. They can be used for power generation, for blower drive, or for other mechanical drive applications.

This paper discusses the types of combustion gas turbines for various applications with particular attention to possible applications in the iron and steel industry. Ratings, fuels and performance data are given for the different types of units.

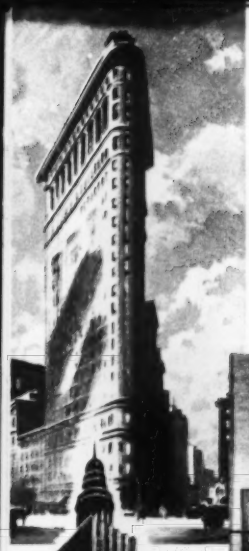
Flash Welding and High Speed Cold Reduction of Strip Steel for Tin Plate, by John Wargo, assistant tin plate metallurgist, and Ray C. Brunner, development engineer, Jones & Laughlin Steel Corp., Aliquippa, Pa.

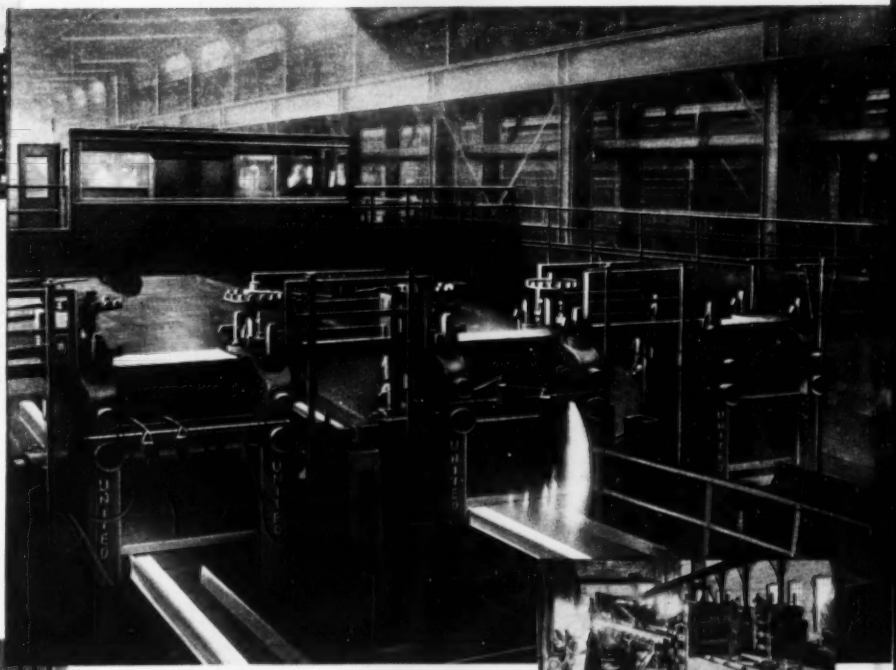
Economic value of a high speed mill can only be realized when such a mill is able to roll consistently a product of commercial quality at or near its rated capacity. Excessive delay time or too frequent operation at speeds below those for which the mill was developed and powered, defeat the purpose of high speed rolling, and production when measured quantitatively is comparable to slower conventional mills.

One of the disadvantages in operating a high speed mill is the nec-

50 YEARS AGO

A Skyscraper Was Something to Wonder At





Modern Rail and Structural Mill

Early Rail and Structural Mill

ELEVATORS did not climb so high nor go up so fast, a half century ago. Steel framing did not lift the pinnacles of architecture so far aloft. The rolling mill had not, under prompting of the designer and engineer, specialized its output of structural members on which to hang such curtains of stone or steel or aluminum as enclose the towers now rising above our cities. As yet there was no need. Skyscrapers as they were known even then were wonderful. Imagination had dared nothing more.

Requisition and performance have followed one upon the other. Now it is said that height is limited only by desire.

UNITED is proud of its contribution to the progress of modern rolling which has given such freedom to building construction.

UNITED engineers will welcome opportunity to study and make recommendations on any problem of enlarged or improved production of structural material.

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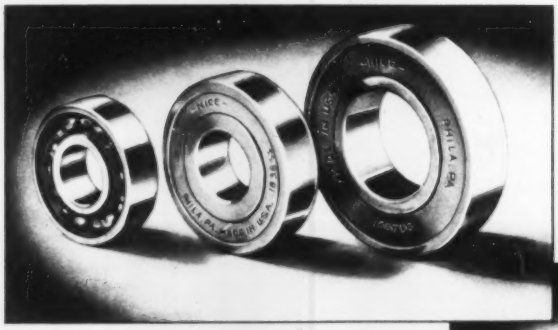
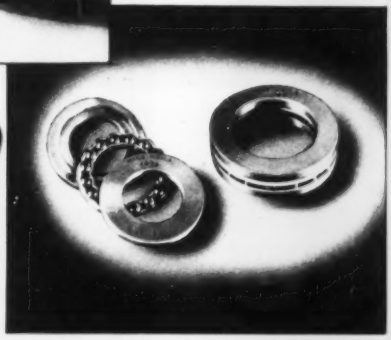


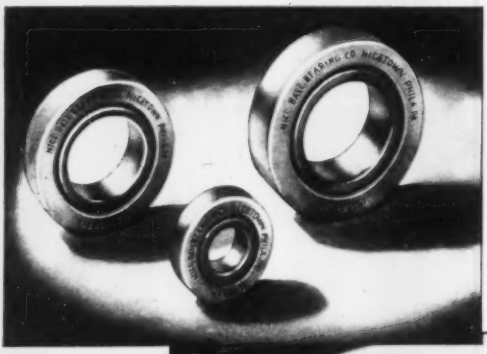
Series 1600 "ground" precision radial bearings.

Series 1000 "ground" precision thrust bearings.

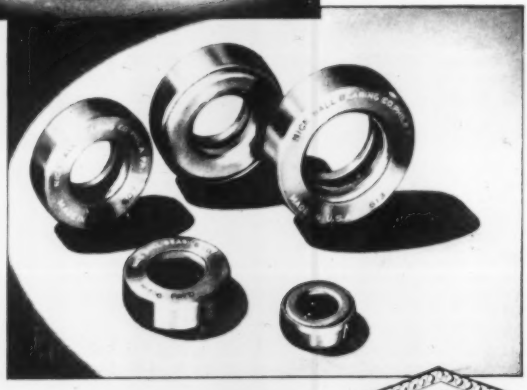


WHAT PRICE *Quality?*

NICE BALL BEARINGS



Series 400 low cost "unground" radial bearings.



Series 600 low cost "unground" thrust bearings.

"Low cost" bearings can be "high quality" bearings. Quality is relative — a comparative measure of dollar value, and can be built into the most inexpensive product.

The Nice Line ranges from close tolerance, precision "ground" ball bearings to low cost "unground" ball bearings of inexpensive design and construction. For "top quality" at any price, specify Nice.

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RF = LC + BP − R

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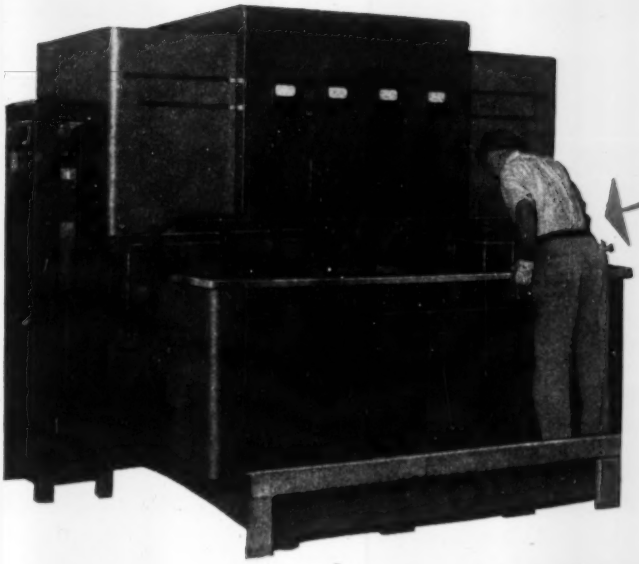

RF = LC + BP − R means: Radio Frequency heating equals Lower Costs plus Better Product minus Rejects . . . and here's how this formula paid off for the Oliver Corporation, Charles City, Iowa.

Oliver needed a heat treating process flexible enough to handle 15 different parts, ranging from ½ inch sleeves, lever arms and valve seats to long shafts. The hardening operation, requiring as many as 10 daily set-ups, had to supply varied parts of consistently high quality, or production would be delayed.

Oliver installed a 50 KW-450 KC RF Generator and work-handling equipment, all Westinghouse-built, which easily handled all parts, and required only about 10 minutes of an unskilled operator's time for changing set-ups. The RF induction heating process drastically cut costs 43%, and there were *no* rejects—with the net result that Oliver is able to produce a better tractor faster and cheaper.

See how this formula—or one of its many variations—has solved the heating problems of other manufacturers—problems that may parallel your own. Write for case history booklet, B-4782, Westinghouse Electric Corporation, Dept. S22, 2519 Wilkens Avenue, Baltimore 3, Md.

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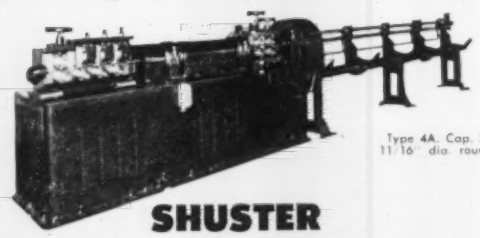
INDUCTION HEATING



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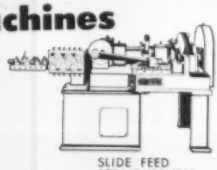
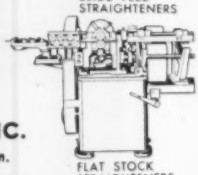


SLIDE FEED STRAIGHTENERS



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essity (because of size limitations in the steelmaking and rolling prior to pickling) of entering into the mill build-up coils containing several welds. Reduction of speed when the welds are rolled, or weld breakage with the possibility of damage to work rolls which might require their removal from one or more stands, can be a serious detriment in attaining the mill's production potential.

The ability to weld strip steel and roll the welds at speed on the cold mill has been and continues to be a very important requirement for successful mill performance. Flash butt welding of hot bands by the electrical resistance method is performed at the Aliquippa works by a hydraulic type machine specifically designed for this purpose. Since the strip is not subject to any considerable variations in cross-sectional area or chemistry, the same general welding practice is maintained on all material welded. Strict adherence to a servicing schedule, particularly in respect to welding dies, has been found necessary for producing satisfactory welds. A sound weld if improperly trimmed is not suitable for cold rolling. To obtain a consistently uniform trim, the automatic weld flash trimmer has been altered from its original design.

Metallurgical Tips for the Maintenance Man, by Michael V. Herasimchuk, maintenance metallurgist, Bethlehem Steel Co., Bethlehem, Pa.

Solving problems on equipment failures is sometimes difficult for the maintenance man because the original metallurgical or engineering factors of design are seldom reviewed with him. To help him recognize when equipment failures are related to metallurgical or engineering principles, this paper presents field studies made on steel mill equipment. It shows how failures have been forestalled or eliminated and points out how the maintenance man is an important part of a research program.

Illustrations include (a) effective use of alloy steel, (b) effect and correction of inadequate design, (c) effect of improper welding practice, (d) effect and correction of improper heat treatment specifications. Further illustrations show how to combat effects of decarburization and stress raisers, and how to study tool wear problems. Emphasis is placed on the importance of relaying accurate information to both engineering and metallurgical departments.

Accurate Steel Mill Weighing, by K. A. Blom, corporation weighing supervisor, Republic Steel Corp., Cleveland.

Accurate and dependable weighing

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The four features illustrated above serve to show how Miller Air Cylinders *for years* have been meeting—*even exceeding*—the high quality set by the recently adopted J.I.C. Pneumatic Standards for Industrial Equipment. See for yourself! . . . write for our free bulletin A-105 and receive also your own *free* personal unabridged copy of these "Standards" with standard symbols, sample circuit, interesting point-by-point comparison—all neatly compiled into a handy booklet that fits your reference file and folds to fit your pocket.

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION; LOW PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FOR 250 PSI; HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES, 2000-3000 PSI OPERATION. ALL MOUNTING STYLES AVAILABLE.

Benefits to You

No Broken Castings
No Scratch-Damage to Piston Rods, Bushings and Seals
NO COSTLY "DOWNTIME"
NO REPAIRS
NO MAINTENANCE
NO POWER WASTAGE

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MILLER MOTOR COMPANY

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AIR AND HYDRAULIC CYLINDERS · ACCUMULATORS · COUNTERBALANCE CYLINDERS · BOOSTERS · AIR HOISTS

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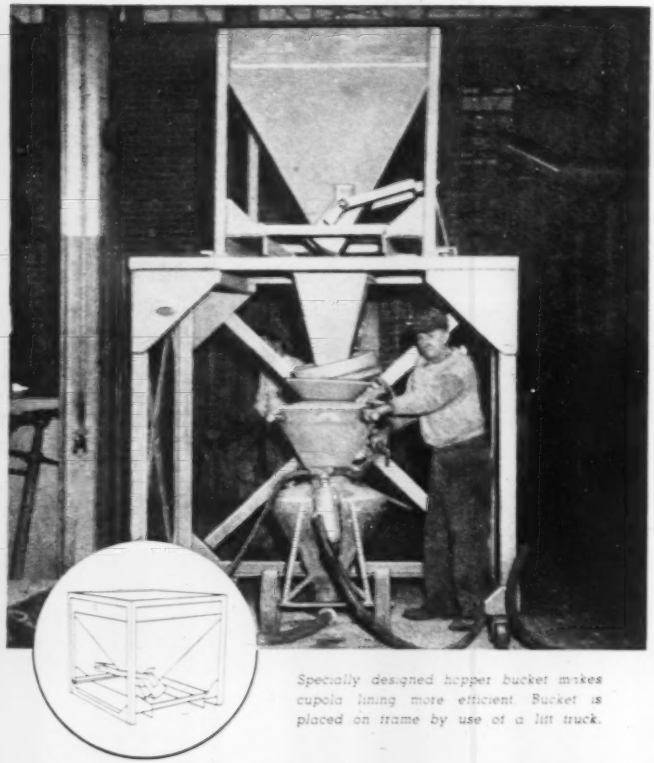


Specially designed hopper bucket makes cupola lining more efficient. Bucket is placed on frame by use of a lift truck.

Solve Your Material Handling Problems With **PENN IRON SPECIAL EQUIPMENT**

In lining cupolas, Textile Machine Works foundry in Reading, Pennsylvania, had difficulty handling the clay mix used with their Bondactor equipment. After a study of the problem, Penn Iron Works, Inc., designed, engineered and manufactured this special hopper bucket for maximum handling efficiency.

Whatever the bulk-material handling problem in your plant, Penn Iron Works, Inc., will be glad to help with its solution. Our wide experience in designing and manufacturing all types of buckets and special handling equipment for foundries can help you cut costs . . . save time . . . increase efficiency.

For Further Information Write:

PENN IRON WORKS, INC.
READING, PENNSYLVANIA

is a matter of major importance, since a number of significant calculations are based on weights. In recognition of this fact, Republic Steel Corp. has instituted a weighing program designed to modernize and otherwise improve all major scale installations. The program is directed by a weighing committee appointed by management and consisting of representatives from all departments concerned.

Track scale checkweighing of outbound products is eliminated. To establish close control of mill weighing, each steel producing district of the corporation employs a weighing supervisor whose sole duty it is to follow all phases of weighing within his respective district. Every shipping and many production scales have in the last three years been furnished with up-to-date, self-indicating recording dials, in an effort to eliminate human errors resulting from beam and poise weighing. Scales are tested regularly and any errors in excess of 2 10 of 1 per cent promptly corrected by a well-equipped scale repair force.

Special attention is being paid to scale repairs and maintenance, particularly preventive maintenance. Scale repair shops in each steel district have been properly equipped with all facilities required to repair any type of scale quickly and efficiently. In some of the larger districts a fully equipped scale service truck facilitates quick repairs.

Shock loading of scales is probably the most frequent cause of scale trouble. This practice results in broken levers, pivots, cut bearings or at the best in jarring knives and pivots off their bearings. To overcome this, Republic has through special arrangement with the manufacturer, introduced a specially designed flexure plate scale for mill weighing. Besides eliminating scale wear completely, this type scale offers greater resistance to shock through greater bearing surface and insures maximum stability of scale multiplication.

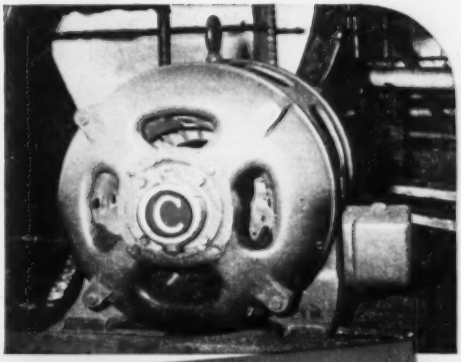
AC Power Distribution in Steel Mills, by D. L. Beeman, manager, Industrial Power Division, General Electric Co., Schenectady, N. Y.

Great strides have been made in the design of ac power systems in general, particularly for steel mills. The progress has been along two lines:

1. Improved system engineering.
2. Improved equipment for the systems.

In the field of system engineering, the most notable advances have been the introduction of the load center distribution system for both high and low voltages, the trend toward higher

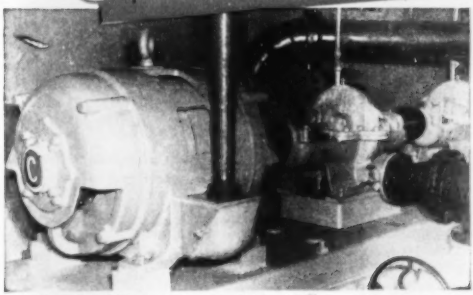
Century 40 horsepower, type SC motor driving an induced draft fan for a stack.



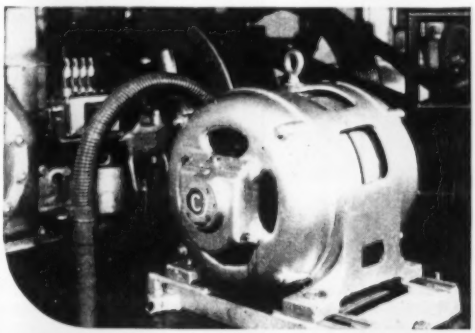
From Century's Line of Electric Motors You Can Select

1. **Right Kind**—to match your current supply
2. **Right Type**—to meet your load characteristics
3. **Right Protection**—against atmospheric hazards
4. **Right Size**—from 1/6 to 400 horsepower

Century Electric Company is celebrating its 50th year in the electrical industry.



Century 150 horsepower, type SC motor driving a two-stage centrifugal pump in a city water plant.



Two Century 75 horsepower SC high torque motors driving refrigeration compressors.

The wide range of kinds, types and sizes of Century motors makes it possible to select a standard motor to meet the requirements of all popular applications.

They are available for both AC and DC current—high, normal and low torque characteristics. Types are also available for applications requiring varying speeds and reversing direction of rotation.

To protect against atmospheric hazards, Century motors are enclosed in open rated drip proof, splashproof, totally enclosed fan cooled and explosion proof frames. Many types are available with vertical and flange mountings as well as standard horizontal bases.

Specify Century motors for all your electric power requirements.

Popular sizes and standard ratings are generally available from factory and branch office stocks.

Century C MOTORS

CENTURY ELECTRIC CO.
1806 Pine Street, Saint Louis 3, Missouri
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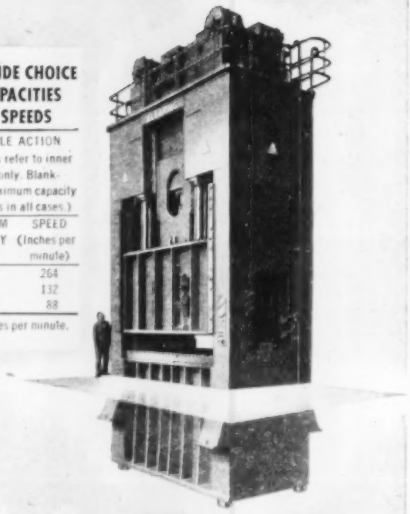
SELECTOR SWITCHES PROVIDE CHOICE OF THESE MAXIMUM CAPACITIES AND CORRESPONDING SPEEDS

SINGLE ACTION		DOUBLE ACTION (Figures refer to inner slide only. Blankholder maximum capacity 500 tons in all cases.)	
MAXIMUM CAPACITY (Tons)	SPEED (Inches per minute)	MAXIMUM CAPACITY (Tons)	SPEED (Inches per minute)
333	264	333	264
667	132	667	132
833	104	1000	88
1000	88		
1167	75		
1500	58		

Quick approach and return—400 inches per minute.



SPECIALIST in VARIETY

Most Clearing presses are built to do some special job with maximum production efficiency and thus at minimum cost per piece. But when the customer's requirement is for a press of wide utility, to take a great variety of work, Clearing still comes up with the right answer.

This hydraulic press can handle a draw of 30" with ample space for lift out. Yet when the work is shallow, it has a minimum shut-height of only 20". All of its 1500 tons capacity can be applied as a single action press, but movement of a few selector switches and removal of brackets makes it a double action machine with a 500 ton blankholder and 1000 ton punch. No slide bolster is necessary. Capacity can be reduced to as little as 333 tons with corresponding increase in pressing speed, and changed back again, with electric switches.

Quick, easy adjustment from one kind of work to another makes this specialist in variety a practical, economical answer to short run or jobbing problems. Ask us to show you how this press, or a different sized variation of it, can fit your requirements.

CLEARING MACHINE CORPORATION

6499 WEST 65TH STREET • CHICAGO 38, ILLINOIS

CMC CLEARING

THE WAY TO EFFICIENT MASS PRODUCTION

voltages, increased use of system neutral grounding, improved short-circuit protection, etc. The load center system approach is based on serving each load area by its own substation or substations. This provides economy at all voltages because the power is taken to the load center at higher voltage and there stepped down to utilization voltage. By having smaller substations for utilization areas, cost of the substation and switchgear for that area is reduced.

Many steel mills are now using 11.5 kv or 13.8 kv instead of 6.9 kv where power has to be transmitted at these voltages in substantial quantities and for relatively long distances. In even larger mills, higher voltages like 22 kv, 34.5 kv, or 69 kv, are used for the basic transmission of voltage from the source point to the load centers. Short-circuit protection, particularly in low-voltage systems, is receiving more and more consideration. Grounding the neutral of all system voltages has shown marked increase in service reliability and marked decreases in system maintenance costs.

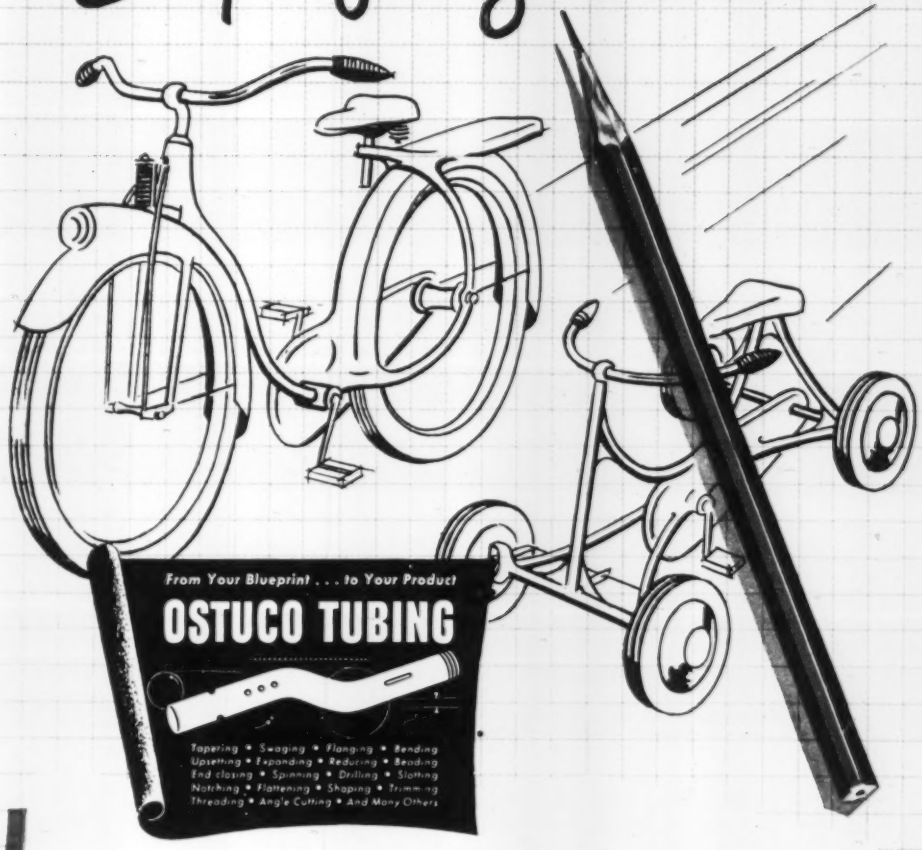
Operation of a 12-inch Continuous Bar Mill, by A. H. Griffiths, superintendent of rolling mills, Sheffield Steel Corp., Kansas City, Mo.

In August 1948, the Kansas City Division of Sheffield Steel Corp. started operating a new type 12-inch continuous bar mill. Four common billet sizes are used in the mill—2, 2¾, 3⅝ and 4 inches. These are heated in a continuous type furnace 32 x 50 feet with a rating of 60 tons per hour. Furnace can heat billets up to 30 feet long and can be fired by gas or oil.

The mill consists of 12 stands, plus three stands of vertical edging rolls, making a total of 15 stands. The roughing and intermediate stands are located in a straight line with No. 9 stand located 10½ feet to the left of the roughing and intermediate train, and stands 10, 11 and 12 situated 10½ feet to the left of No. 9 stand, thus allowing the use of two 180-degree repeaters.

Rolls used in stands 1, 2 and 3 of the roughing train are 18 inches in diameter by 36 inches in length, the 5-stand intermediate rolls are 14 inches in diameter by 32 inches in length, and the finishing rolls are 13 inches in diameter and 24 inches long. The rolls used in No. 1 and No. 2 edging stands are 13 inches in diameter by 7 inches in length, and No. 3 edging stand is 15 inches in diameter by 3½ inches long. Rolls are driven by individual variable speed motors with the exception of No. 1 and 2 stands and No. 4 and 5 stands.

Shape of things to come...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Whether your product appeals to the younger generation or grown-ups, long-range planning is a part of your sales strategy.

In exploring future product possibilities, give consideration to versatile OSTUCO Steel Tubing. Advantages are many—opportunities are unlimited. For design improvement, increasing strength while reducing weight, enhancing beauty, and lowering production costs—no other material can match OSTUCO Steel Tubing.

While we cannot always promise early delivery estimates on new civilian orders, our experience-wise engineers are at your service to help make your *future plans take shape* with OSTUCO Steel Tubing.

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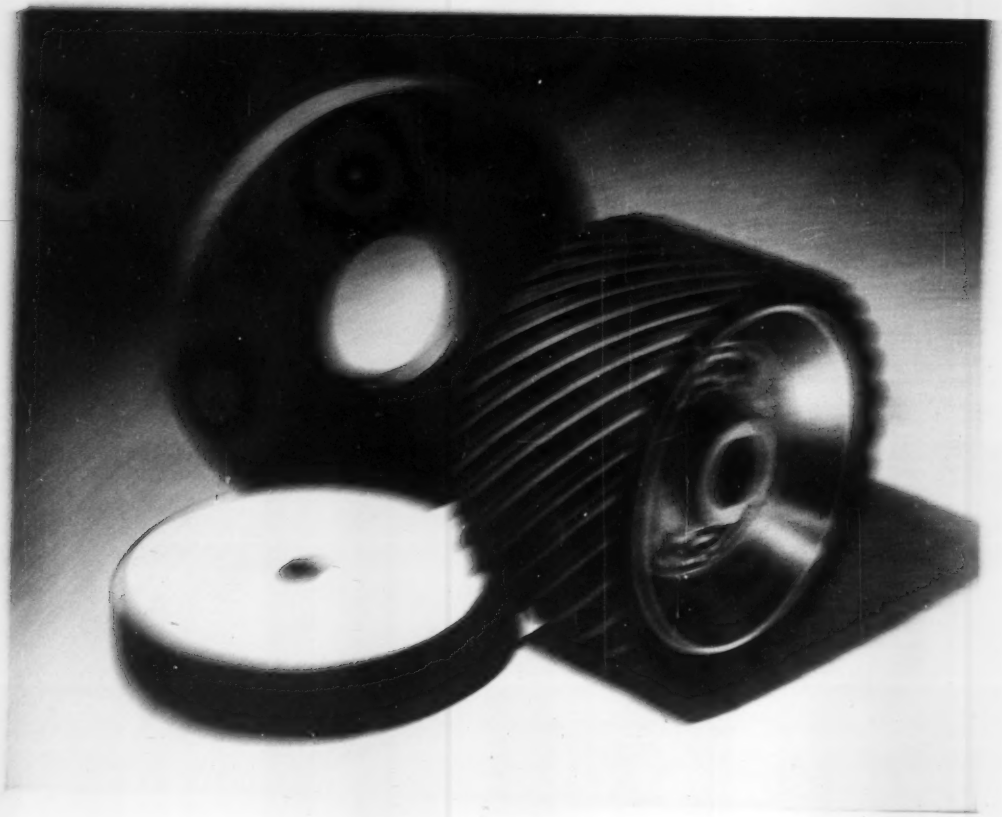


Too many wheels?

[illegible]

Only **CARBORUNDUM**

[illegible] Abrasive Products . . . to give you the proper **ONE**

[illegible] *The Carborundum Company, Niagara Falls, N. Y.*

STEEL

These are coupled together by a motor for each set of stands.

No. 1 and No. 2 stands are driven by a 500-hp motor with an 800-hp motor driving No. 4 and No. 5 stands. The remaining stands are driven with their own individual 500-hp motors. No. 1 edger is driven by a 150-hp, No. 2 by a 100-hp, and No. 3 by a 100-hp motor.

Finished product from the mill can be either coiled or run onto the cooling bed depending on the orders.

The mill has been a good producer. During May 1951, it rolled 11,779 net tons consisting of 35 sizes of angles, in 267 operating hours.

Reconditioning Air Filter Oils, by George Findlay, lubrication engineer, Republic Steel Corp., Buffalo.

The steel industry, until recently, has attempted only to a very limited extent to filter air used in its operations. In effect, the only general approach to the use of filtered air throughout the industry was confined more or less to cooling large critical motors, motor generator sets and motor rooms.

Where periodic impeller replacement or repair intervals can be extended to any major extent, the attendant savings offered will quickly amortize the initial investment of the filtering equipment. The savings involved include reduction in abrasive wear of impeller blading, lessening of down time for repair and replacement of blading, etc.

Several different types of air filters are employed in the steel industry, with those of the travelling screen design predominating where blast furnace blowing equipment is involved. Primary purpose of the air filter in this case, is that of removing only the solids which will tend to abrade the blading.

Experience has indicated that to be effective, the air filtering equipment must be maintained on a continucus operating cycle. This in turn demands the installation of an automatic auxiliary oil reconditioning system to maintain oil in the screen reservoirs within acceptable limits of clarity. Changes to existing screen reservoir design would simplify the installation and increase the efficiency of the oil reconditioning unit.

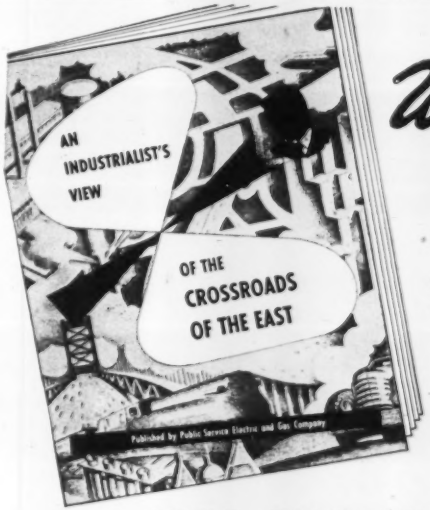
This type of reconditioning system is found to maintain the flash point characteristics of a mineral oil, as used in the air filter reservoirs within the limits of safe operation. After investigation of the nonflammable fluids which are sometimes recommended for this service, it was deemed advisable to accept the possible fire hazard associated with the use of mineral oil in preference to the toxicity hazards involved with the use of the former.

Roll Turning with Tracer Controlled Lathe, by Frank F. Zipf, superintendent, roll department, Bethlehem Steel Co., Johnstown, Pa.

The author describes briefly the development of tracer controls for various machine tools for a better understanding of their application to lathes. The article also gives a brief description of the different types of tracer controls, both electric and hydraulic, and the usefulness of this type machine in roll turning. Steps are also covered in the selection of the proper grade of carbide tools which has made it possible to use this type of machine in the roll turning craft.

Heat Relief in Hot Industries, by B. R. Small, staff engineer, mechanical engineering department, Aluminum Co. of America, Pittsburgh.

Metal producing industries are obtaining increased returns from investments that provide employee relief from excessively hot working conditions. Industrial ventilation now utilizes radiant heat shielding at furnaces, local or spot air cooling and crane cab air conditioning. Increased building ventilation rates are made



Written for You!

JUST OFF THE PRESS

Are you interested in the industrial advantages offered to manufacturers in New Jersey, the Crossroads of the East?

Do you want to know the facts behind the success stories which have been accomplished by so many, diversified industries in New Jersey?

If you do, this booklet was written for you . . . and it's just off the press! It's called "The Industrialist's View of the Crossroads of the East", and within its 32 pages are complete reports written in digest style to give you the information you want about New Jersey quickly, clearly and completely.

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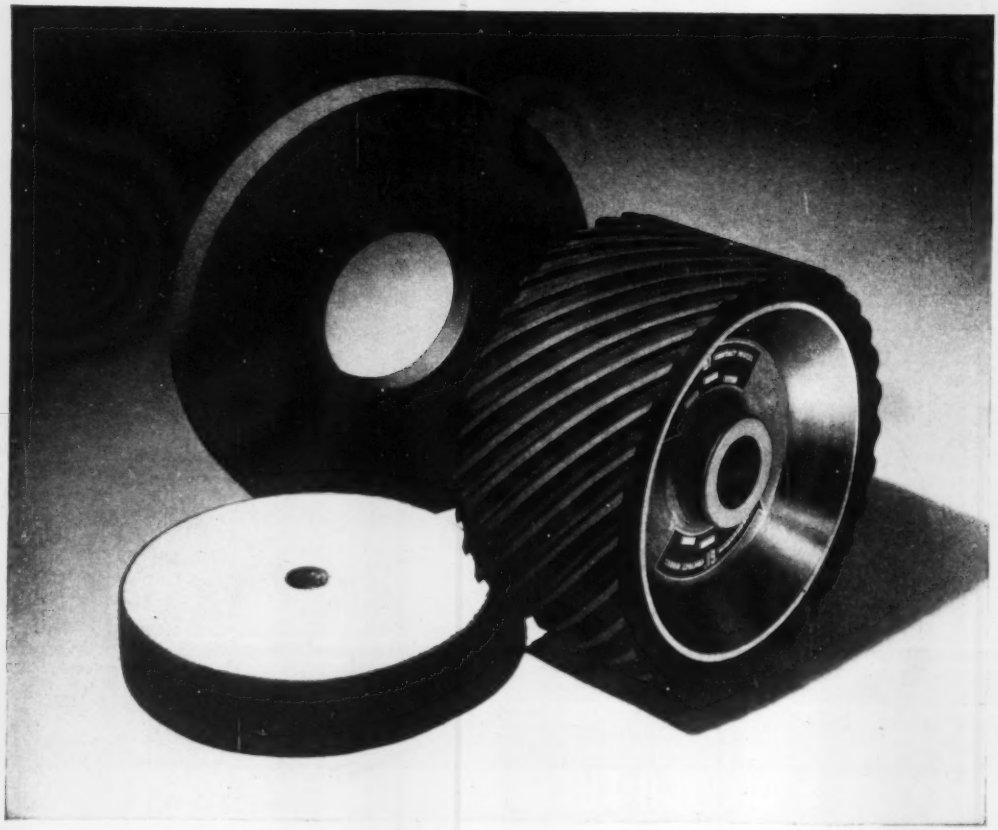
CROSSROADS
of the EAST

PUBLIC SERVICE
ELECTRIC AND GAS COMPANY
NEWARK, NEW JERSEY



Too many wheels?

Not when each wheel represents a basic method of abrasive application. The "61" Contact wheel is used with an abrasive belt. The "Set-up wheel, with grain applied to its periphery, is ideal for many types of polishing. The grinding wheel is perhaps most familiar.

Each wheel is specially designed to perform a specific job better, faster and at less cost. *All* of these are available from one source... CARBORUNDUM. For, only CARBORUNDUM makes all abrasive products, from which you can select those best suited to your operations.

That's why more concerns are looking to CARBORUNDUM for the right answer to every abrasive need. Next time... call in CARBORUNDUM... and be sure.

Only CARBORUNDUM

TRADE MARK

makes ALL Abrasive Products... to give you the proper ONE

"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company, Niagara Falls, N. Y.

These are coupled together by a motor for each set of stands.

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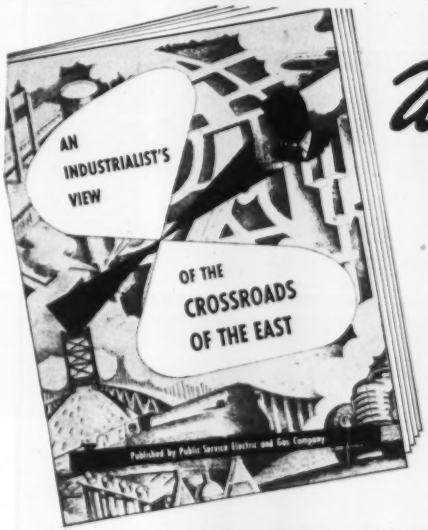

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NEW JERSEY CROSSROADS of the EAST

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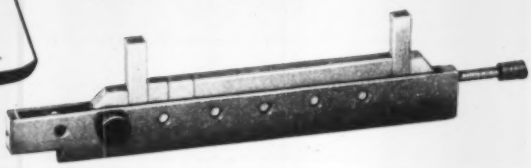
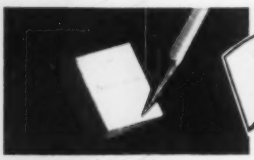
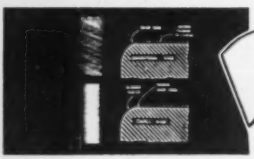
A complete line of accessories.





A control number on every block.



Burr-proofed edges.

A compact case.

PERHAPS you have never investigated the enormous possibilities in Gage Blocks for controlling dimensional accuracy and reducing spoilage! Look over the page at the right! You have some or all of these problems.

A set of 83 DoALL Gage Blocks with accessories *will make over 120,000 different snap gages for about 1/4 cent each.* Any one of these gages are made quickly. Just fit the blocks together with the necessary holders and you are ready for any measuring job—checking finished work, jigs and fixtures or other working or inspectors' gages.

DoALL Gage Blocks are *accurate to millionths of an inch.* They are ready when you want them—there is no loss of time or waste of good tool steel as when making your own gages.

With a set of DoALL Gage Blocks and the DoALL Accessories you are fully equipped for absolute perfection in dimensional accuracy control. There is a full line of blocks in sets for every purpose in either Metric or English. You *can't buy* finer inspection equipment.

Ask for a demonstration of DoALL Gage Blocks in your plant. Your local DoALL Service Engineer will show them to you. Write or call!

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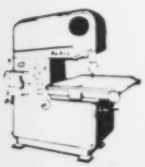
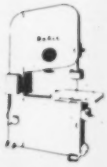
THIS BOOK will help you! MODERN MEASUREMENT CONTROL. Twenty pages describing DoALL Gage Blocks and accessories and how to use them. Ask, too, about DoALL Calibration Service for your present Gage Blocks. ➡

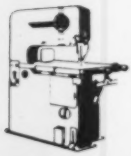
GB-4



CONTOUR-MATIC



ZEPHYR



CONTOUR

BAND FILER

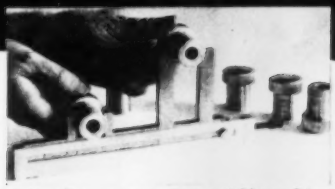
TOOLROOM GRINDER

CRUSH GRINDER

DoALL *Gage Blocks*

1. You get measurements in millionths of an inch!
2. You can "build" a gage in a matter of minutes!
3. You cut no metal — waste no material!

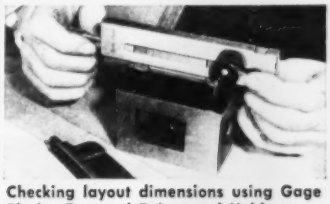
Checking your working gages — micrometers, calipers, snap gages, etc.



Go and no-go gages are quickly and inexpensively set up for checking parts.

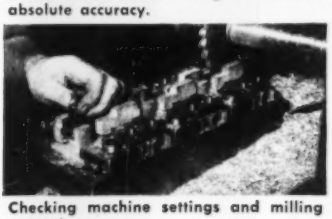
Height Gages for checking heights and bore diameters.

Scriber Point scribes straight lines with absolute accuracy.



Checking layout dimensions using Gage Blocks, Trammel Points and Holder.

Gage Blocks, Comparator and Sine Bar being used to check bevel gear.



Checking machine settings and milling operations.

Checking fixed gages and snap gages with DoALL Gage Blocks.

Gage Blocks combined to check an adjustable snap gage.

Take time pieces for example . . .

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Elgin National Watch Co.	Bulova Watch Company	Telechron
Hamilton Watch Co.	Minneapolis Honeywell Regulator Co.	International Business Machines Corp.
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STAINLESS STEEL TUBING

possible by fan-powered roof ventilators, either conventional round wind-band design or the more convenient blackout or dome top styles.

Recently developed methods of radiant heat shielding by portable reflective sheet metal curtains have aroused considerable enthusiasm among operating crews and supervisors. About 90 per cent of the radiant heat from a hot furnace shell or brickwork surface can be intercepted by a curtain that comes to equilibrium only 20° F above room temperature. The convective component is dissipated as hot air through existing roof ventilators. In certain situations rather startling results have been obtained by this method.

For severe conditions unsuited to radiant heat shielding, an alternate method for sparsely populated areas consists of local or spot cooling, a method long used for shipboard engine and boiler rooms. Cooled air in this type of installation does not involve air conditioning, but merely washed air delivered from grilles at 80 or 85° F during hottest weather. This method may eliminate the need for increasing the ventilation rate, a step of formidable proportions in a large building.

In colder climates, serious situations often arise regarding inadequate heating and cold drafts. Studies indicate that these are by-products of the summer natural draft ventilation program with its open type buildings that are not easy to close in winter. Where better heating is required, consideration of winter as well as summer aspects frequently favor power ventilators and easily controlled air inlets, by means of which steam saving and uniform heating can be secured.

Layouts of new or modernized plants may benefit directly from ventilating considerations in early conferences. In one case, for example, a more compact building arrangement and a shorter production flow line was made possible by eliminating one line of space-wasting courtyards. Ventilation benefits were retained by use of a forced air supply, obtainable today without ductwork by use of the new fresh air type roof ventilators.

Considerable groundwork should be done with these applications before major projects are submitted to management, because radiation shielding and spot cooling procedure is still far from standardized. Further, various engineers as well as operating personnel have different yardsticks for measuring the end results in heat relief. Again, each plant and department frequently has special conditions that must be taken into ac-

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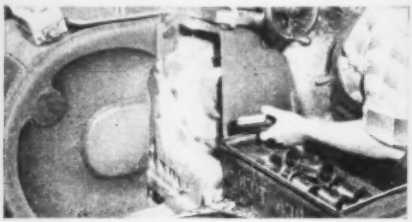
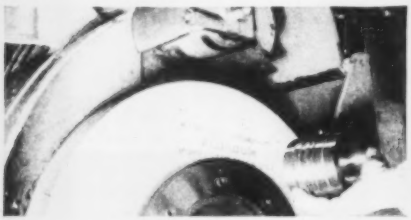


A plunge-cut grinding job to a shoulder on a centerless machine. Units being ground are textile machinery parts, for which wheels of Norton ALUNDUM* (fused alumina) in the correct grain size and grade, give best results.



Shaping a wheel by crush truing, with hardened steel crushing roll shown in raised position. Both Norton ALUNDUM and CRYSTOLON* wheels can be crush trued, to give excellent results in this rapidly growing method of grinding intricate O. D. contours.

HANDY ILLUSTRATED BOOKLET gives you the essential facts on cylindrical and centerless grinding and provides convenient selection charts. Ask your Norton Distributor for Form 2006. Or write direct for free copy. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities.

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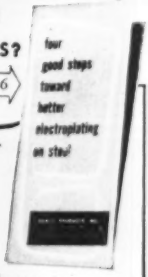
HAVE YOU TAKEN THE FOUR GOOD STEPS?
See page 6



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- ¶ What are four easy ways to improve the average rinse tank? *See page 10.*
- ¶ What rinsing fault is "an invitation to trouble" in the plating of high-carbon steel? *See page 11.*
- ¶ Why is it better to clean steel with reverse current than with direct current? *See pages 12 to 14.*
- ¶ What causes hydrogen embrittlement during electrocleaning? What is the remedy? *See pages 15 and 16.*
- ¶ One part chromic acid in 1,000,000 parts of cleaning solution—does that spell D-A-N-G-E-R? *See page 16.*
- ¶ How can an ordinary electrocleaning cycle be transformed into an exceptionally good cycle? *See Cycle E on page 23.*

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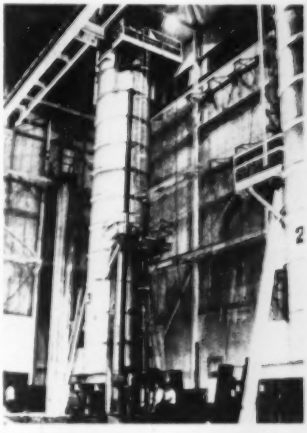
count. In spite of these road blocks, this new phase of industrial engineering can valuably contribute to plant economy and increased productivity.

A Comparison of Electric Furnace and Open Hearth Economics, by H. W. McQuaid, consulting metallurgical engineer, Cleveland.

This paper discusses in some detail the fundamental economic factors underlying the general steel industry and how they affect the choice of a melting unit. The question of location and size of markets, type of finished products and the general factors of supply and demand under present conditions and how they affect the choice of a melting unit are reviewed. At the same time, the difference in melting requirements under different degrees of integration and how these affect investment and operating costs are discussed and some of the limitations of the large tonnage fully integrated plants pointed out.

Present problems of freight absorption, delivery priority and steel short-

Heat Treating Done Vertically



HIGH STRENGTH extruded materials over 45 feet long and weighing up to 3000 pounds can be heat treated at Harvey Machine Co. Inc., Los Angeles. The unit shown above is the third installed at the company's aluminum extrusion plant, is electrically heated and has electronic controls. Material is mounted in a special holder, lowered into a water well seven stories deep and then hoisted inside the cylindrical heat treating units some six stories in height. Following heat treatment material is lowered into the water well for quenching

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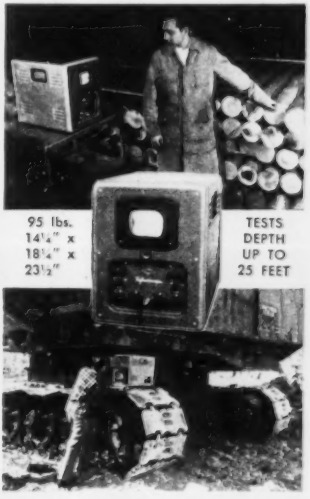

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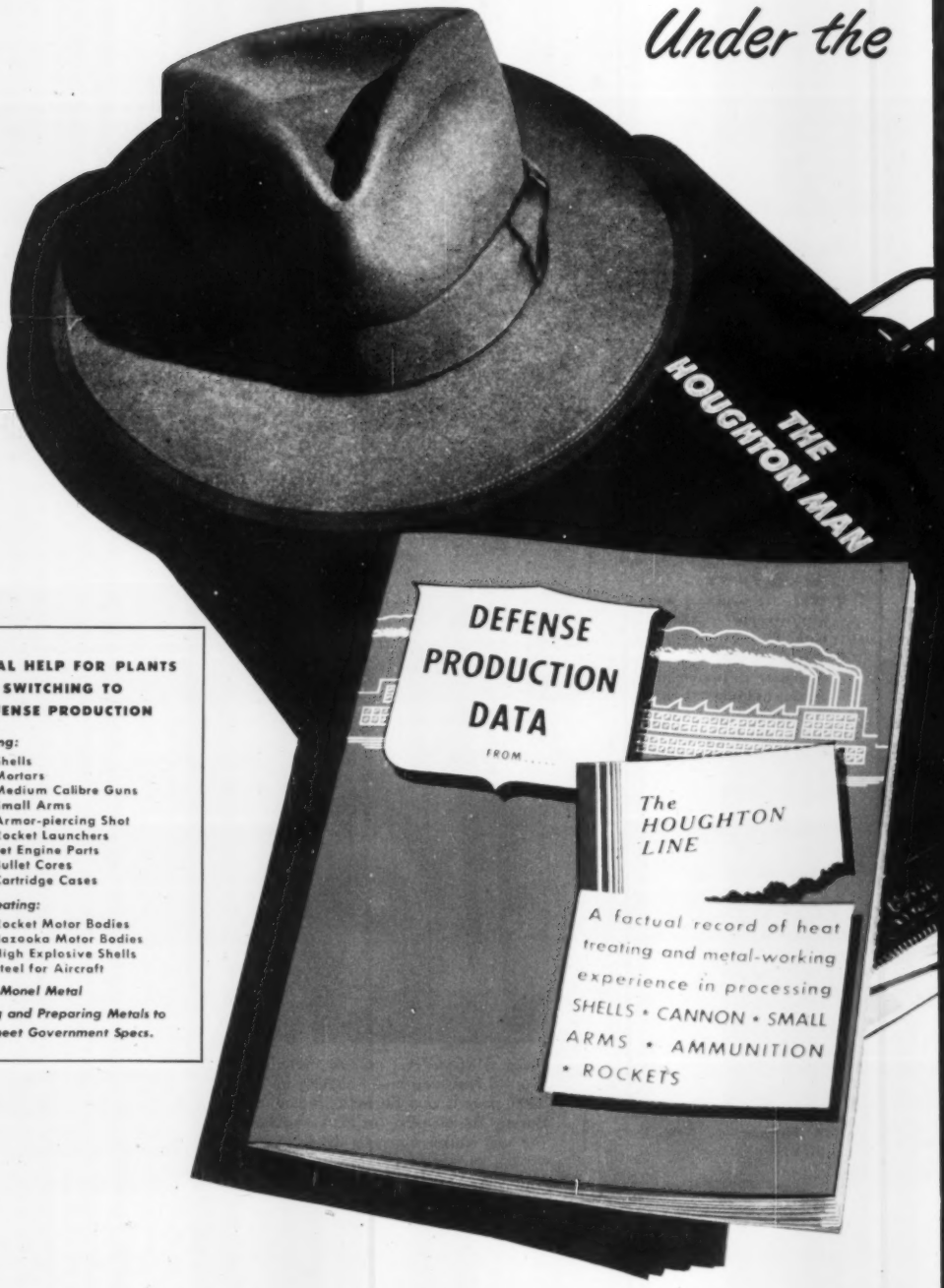
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FROM
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A factual record of heat treating and metal-working experience in processing SHELLS • CANNON • SMALL ARMS • AMMUNITION • ROCKETS

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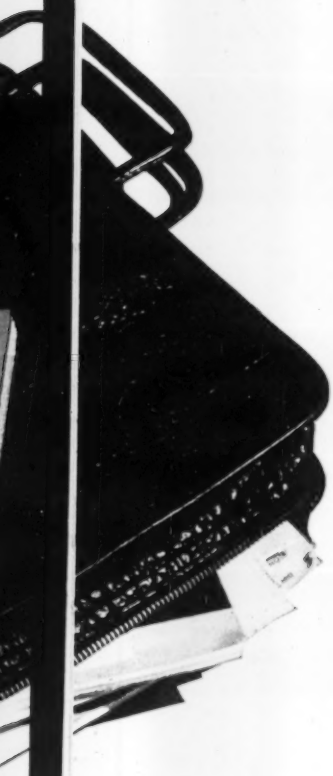

• Getting out into the shop as Houghton men are invited to do, they meet up with a whale of a lot of metalworking problems.

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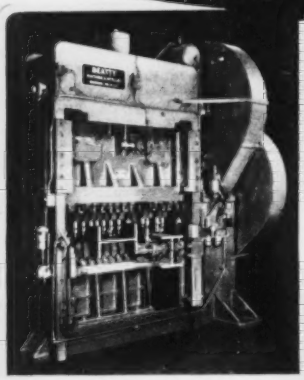
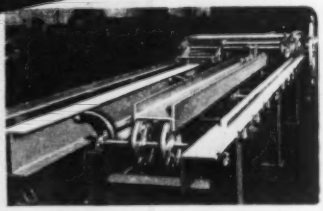
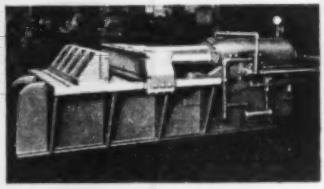


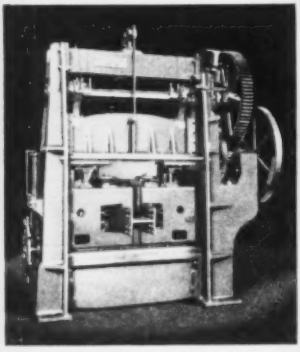
BEATTY No. 9 Guillotine Beam Punch for flange and web punching of beams up to 30".



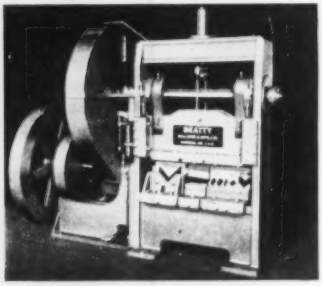
BEATTY Spacing Table handles flange and web punching of beams without roll adjustment.



BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.



BEATTY Adjustable Flange Punch Tools punch all 4 flanges of I-Beams and wide flange beams at one pass through.



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ages of a large group of steel users are discussed and their effect on the demand for the installation of new steel producing equipment closer to the markets is noted. The subject of the economics of the small semi-integrated steel production unit in the more remote areas and what will be necessary to develop such plants is also discussed.

Examples are given of investment and production costs for different applications and the advantages of the electric furnace over the cold iron open hearth are noted. The large fully integrated hot metal open hearth plant is still able to produce more cheaply than the modern electric but only at a substantially greater investment all along the line.

One field for the electric melting furnace will be in its use in relatively small section ingots or the continuous casting process which permits rods, piercing billets and hot strip to be rolled directly from the cast ingot. The logical continuous-casting section is the wide slab of limited thickness.

Direct reduction of ore with the new low cost hydrogen now available promises in the near future to supply a charge material which will supplement scrap and tend to stabilize scrap prices and thus insure a charge for the electric furnace which will overcome the serious economic disadvantages of scrap as at present. This will make it more difficult for the open hearth even when operating on hot metal to produce ingots at a cost which is competitive with the modern high powered electric arc furnace. This development is discussed in some detail.

Future of the electric furnace lies in its contribution to the decentralizing of the steel industry. It provides the basis on which relatively small steel plants can be located in steel consuming markets at present relatively remote from the steel producing centers and supply these markets with standard or special steel products more economically than by any other means. It is pointed out that with the development of continuous casting and hydrogen reduced iron ore, there is a very strong possibility that the position of the open hearth may, in the not too distant future, be threatened in all but a few large steelmaking centers by the high powered modern arc furnace.

Chuck Data Published

Skinner Chuck Co. has published a 68-page booklet entitled, "Chucks and Their Uses." Photos and drawings show all types of standard and many special chucks. A full description is given on each type, giving details of

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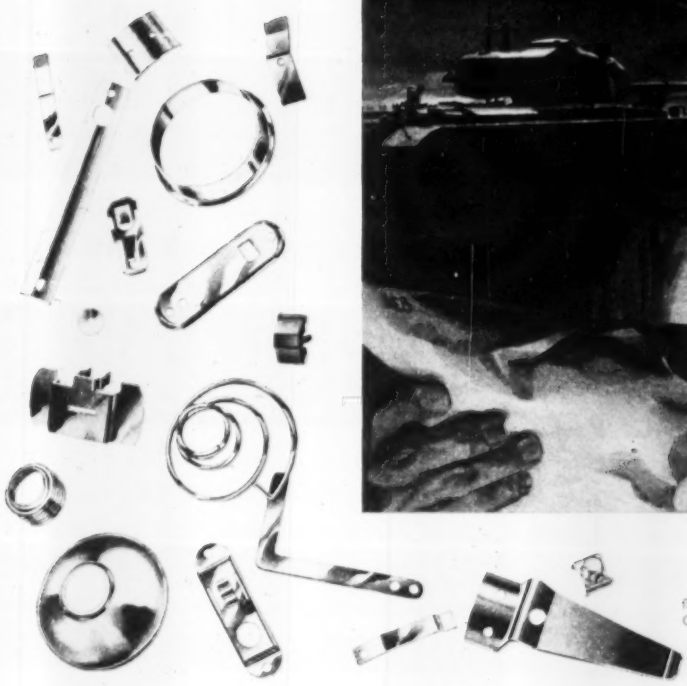

These eighteen copper alloy parts, illustrated approximately half-size, go into the military flashlight produced by The Niagara Searchlight Corporation of Buffalo, N. Y. Only copper alloys can provide the complete range of physical properties needed and still maintain low manufacturing cost.

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Tension Tests Data on Rolled Strip Amplified

COMMENTING on the series of articles "Cold Rolling Strip—An Appraisal of Today's Theory and Practice" by J. D. Keller recently presented in STEEL, N. H. Polakowski, metallurgical department, University College of Swansea, Swansea, England, presents some problems of wide interest. He states:

"The author in the May 14 issue of STEEL, page 98, considers the yield strength in tension to be equal to that in compression, and considers the higher values of compressive strength actually obtained to friction in the first place and to the lateral constraint in the second.

"I am not in agreement with these statements. It is true that ductile nonferrous metals do possess equal yield strengths in tension and compression, but this does not apply to steel. In carbon steels of all descriptions and also in numerous low-alloy steels the compression curve (in "actual," or "true" stress units) runs appreciably higher than the tensile curve, although the initial yield points are practically equal. I have made hundreds of experiments of this kind with always the same results, the difference between the two curves reaching over 10 per cent. Similar results were obtained by Siebel and Pomp 25 years ago and are reproduced in Nadai's book.

"If Huber's yield theory were applicable to the present case, one would expect the initial compressive yield strength of the annealed material to be about 15 per cent higher than in simple tension, provided the compression test is carried out on a fairly wide strip. Ford's comparative tests to which Mr. Keller refers show clearly that this is not the case, and the *constrained* compressive yield point occurs precisely at the same stress as does the yield point in tension. Why this is so, nobody seems to know, but this is the fact.

"Another important factor, which suggests that tension tests on rolled strip must underestimate the resistance offered by a metal to deformation by rolling, is known as the "Bauschinger Effect." This effect acts so that the resistance of a metal to deformation is reduced if a meth-

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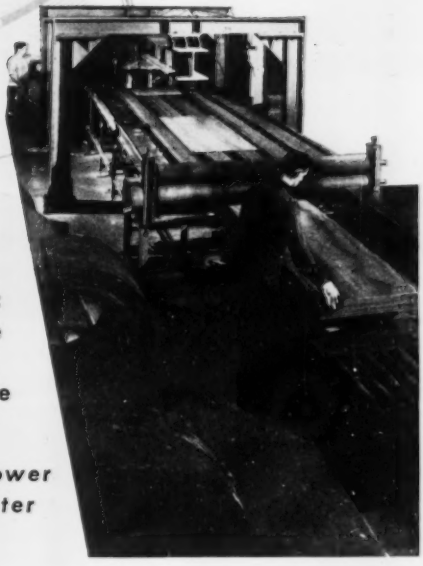

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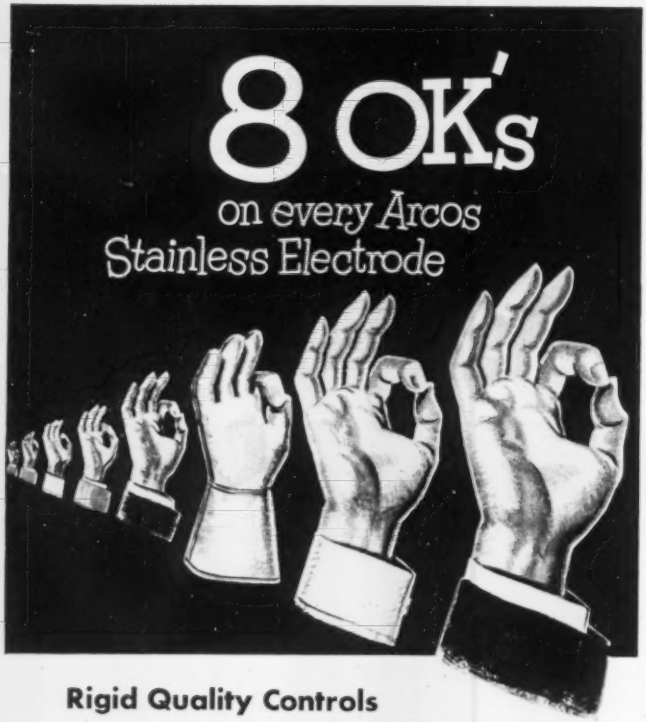

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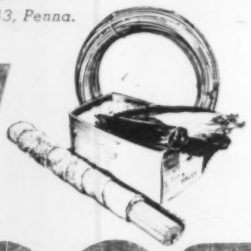

WELD WITH ARCOS

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od of deformation is applied different from that used initially. If both methods of deformation differ little, the B-effect is small, but if they are different, it can be pronounced. It is easy to see that rolling is similar to compression, hence a small B-effect. On the contrary, tension is entirely different from rolling, hence the effect is strong, and consequently the yield strength is artifically depressed thus leading to unduly low yield strength figures. It may be added that a study of the Bauschinger effect and its implications offers a key to numerous unsolved problems of considerable practice interest, also in the rolling of metals.

"Mr. Keller suggests on page 100, of the same issue, that in my explanation of the speed effect in cold rolling, I have neglected the influence of the rate of strain upon the resistance to deformation. In actual fact I did not neglect it, but omitted it purposely (as can be understood from the Synopsis), since it was not essential for my thesis.

"One of the main objects of my paper was to explain why heavy ends are being produced on thin strip during acceleration and slow-down periods of cold mills. I attributed this phenomenon to the dependence of strip-to-roll friction of rolling speed, and have demonstrated that there is a close agreement between the behaviors of ductile metals when compressed, on one hand, and when rolled, on the other. As the ratio of threading to running speed in strip rolling is usually about 1:10, the effect of rate of deformation on roll force and strip gage can be only negligible, as is clear from Mr. Keller's Fig. 19. If these small changes are superimposed on Ford's diagrams, the difference will be hardly noticeable.

"I will be only happy to accept any better explanation than the one I gave, but so far I have not seen any. On the contrary, many recent authoritative results, both American and British, seem to support it.

"It may be of interest to note that similar findings to those made by Powell and Kaufman, as reported on page 86 of the March 26 issue, were made 15 years ago by Emicke and Lucas on a 14-inch laboratory mill."

REFERENCES

1. N. H. Polakowski: *Jl. Iron and Steel Inst.*, 1949, vol. 163, pp. 250-276.
2. N. H. Polakowski: *Jl. Inst. Metals (Brit.)*, 1949/50, vol. 76, pp. 755-757.

Replying to Mr. Polakowski's very interesting discussion, Mr. Keller comments as follows:

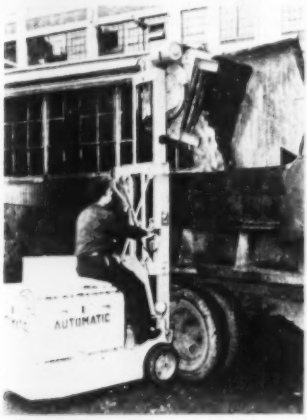
"The question whether the yield strength of steel strip material determined by tensile tests or the value determined by compressive tests, with certain corrections, should be used

in calculating roll pressures in cold rolling, must be regarded as still open. Mr. Polakowski's statement on this seems not in agreement with H. Ford's results (Reference No. 4) as given in Ford's Fig. 13 and discussion on his page 123, or with the later paper by Ford, Ellis and Bland (*Jl. Iron & Steel Inst.*, vol. 168, May 1951, page 4 and Fig. 9), where the compressive yield strength of steel after correction for lateral constraint averaged only about 3 per cent higher than the tensile yield strength—a difference possibly explainable by the extreme difficulty of entirely eliminating the end friction effect in compressive tests.

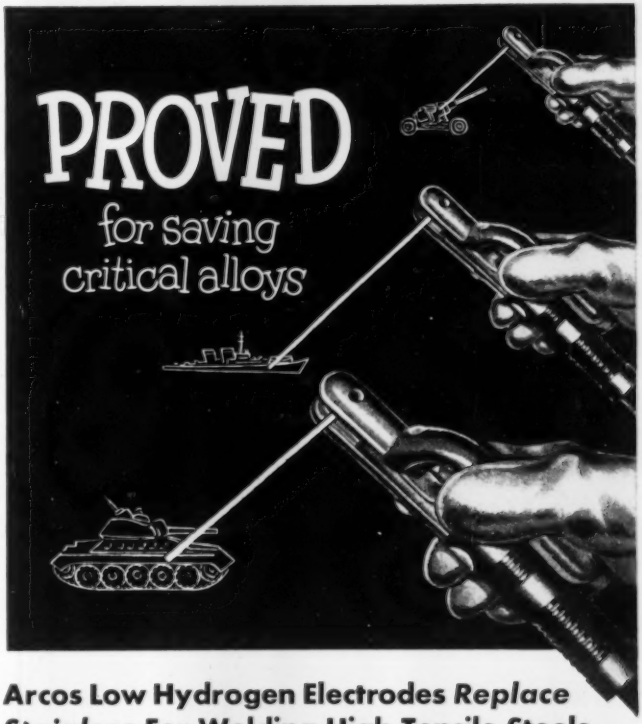
"By a coincidence, on the same day on which Mr. Polakowski wrote (July 23), Part VII was published in STEEL, wherein the Bauschinger effect was discussed at some length. However, in the first pass in cold rolling strip the Bauschinger effect would not occur, while in later passes it can play little if any part as regards the strip itself, since the yield strength of the latter has then increased practically to coincidence with the ultimate strength (Part VIII, p. 91.)

"In my reference to Mr. Polakowski's 1949 paper in Part V, I by no means wished to minimize, or to set aside with slight regard, his very ingenious theory concerning nonho-

Fork Truck Performs Extra Job



DUMPING a bin of scrap into a truck at Fafnir Bearing Co., New Britain, Conn., is this electric fork truck with a rollover attachment made by Automatic Transportation Co., Chicago. Slots cut in the base of bin accommodate the forks. The company is able to use its fork trucks for a variety of jobs in addition to handling materials in process by a little ingenuity in adapting them to these "bonus" tasks



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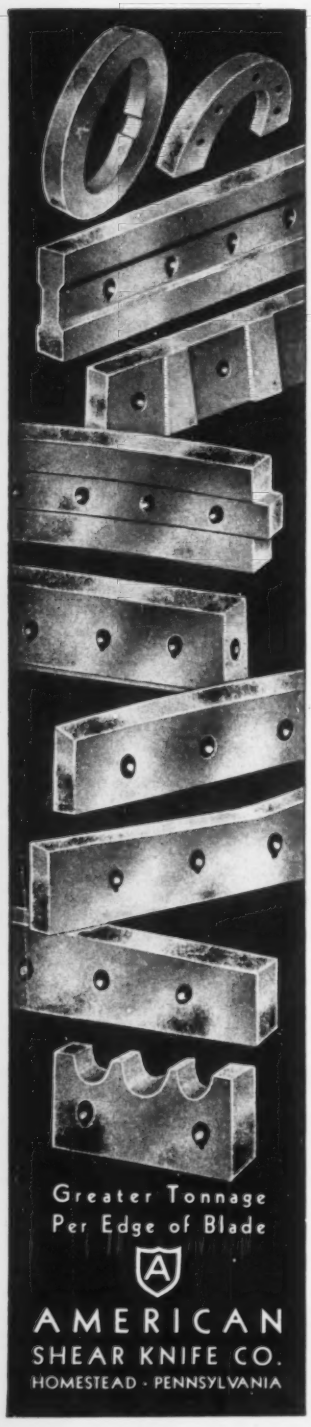

mogeneous versus homogeneous deformation, but only to point out that much further study both theoretical and experimental will be necessary before his theory can be considered definitely proved or disproved."

Air Supplied for Varying Needs

A line of control system zoning Weathermakers, designed especially to provide independent control of air conditioning in separate areas of a building through a single unit, is announced by Carrier Corp., Syracuse, N. Y. Five sizes are being produced with air conditioning capacities ranging from 12 to 58 tons. The number of zones possible with the factory-built damper section varies from five for the smallest size to 14 for the largest. Intermediate sizes include seven and ten zone units.

Company officials said the units will be particularly useful in office or other multiroom buildings, manufacturing plants and other spaces where cooling or heating loads vary in different rooms or areas due to the changing position of the sun. In manufacturing plants, startup or shutdown of heat producing power equipment in various parts of the plant or the need for different processing temperatures makes zoning equipment especially applicable.

The new units are of the horizontal blowthrough type. Damper control for separate zones is provided through a double outlet arrangement, with one outlet supplying cooled and dehumidified air and the other supplying warm air. These twin outlets are divided into separate dampering compartments.

An independently operated double damper in each twin compartment regulates the proportion of warm and cool air for the zone, shutting down on the supply of one as the other is increased. Although normally mounted on the unit, the entire damper section can be set up in a remote location by installing warm and cool air ducts to the damper.

Aid for Welding Nickel

A booklet on the fusion welding of nickel and the high nickel alloys has just been published by International Nickel Co. Inc. It contains 44 pages and includes more than 30 tables and almost 50 drawings and photographic illustrations. It covers various forms of electric arc welding as well as gas welding. There are over 20 chapters and sections covering, in addition to detailed welding instructions, such information of importance to production and welding engineers as the boiler code of the American Society of Mechanical Engineers, pickling,

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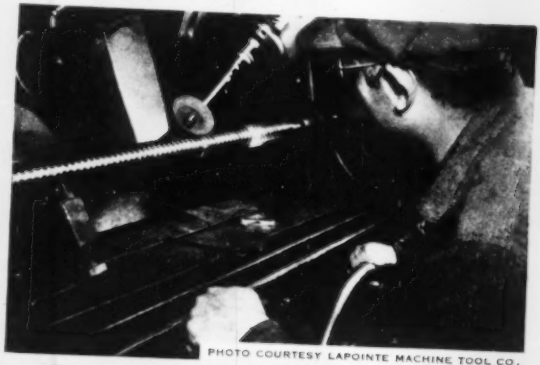

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testing and inspection safety methods and associated topics.

Designated as technical bulletin T-2, the booklet is available without charge through the Technical Service Section, International Nickel Co., 67 Wall St., New York 5.

"Air Repair" Makes Its Bow

Air Repair, a new quarterly magazine devoted to the problems of air purification is to be the official publication of the 44-year old Air Pollution and Smoke Prevention Association of America. Its offices are now located in Mellon Institute, Pittsburgh.

Editor is Robert T. Griebling, a fellow of Mellon Institute and executive secretary of the association.

"There's a great deal of ground to cover," Mr. Griebling stated. "Study of air pollution abatement is most complex, requiring a knowledge of chemistry, physics, engineering, meteorology, and technology, and the subjects that present themselves for editorial treatment are endless.

"We want this new magazine to be a medium of exchange and information not only for our own members, but also for everyone interested in the problems of air pollution. We aim to keep our people posted on the latest activities and improvements in methods, techniques, and equipment. We want to assemble ordinances and be able to advise communities on practical and sensible legislation which will be of greatest good to the greatest number".

The association has more than 700 members at present. It is composed of municipal air pollution abatement officials, scientists, industrialists, and equipment manufacturers. To date, they have exchanged information principally through the publication of the proceedings of annual meetings, through correspondence, and through sectional meetings held several times a year in addition to the annual meeting.

Second issue of *Air Repair*, appearing this month, covers a discussion of gob piles, playground dust problems, incinerator construction, a meeting of the East Central Section, to be held in Detroit, some recent observations concerning the Los Angeles area problem, and other subjects.

Load Accurately Positioned

Crane controls so sensitive they can regulate the movement of a 250-ton load to within 1/32-inch were tested recently at McNary dam near Umatilla, Oreg., by the U. S. Army Corps of Engineers. Developed by Westinghouse Electric Corp., the ad-

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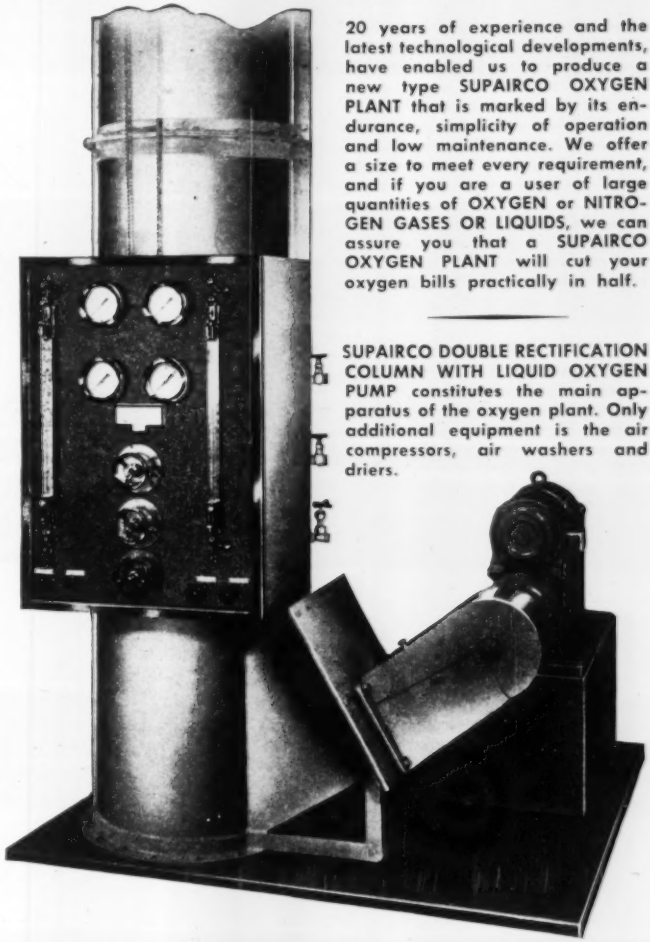

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COPPER ALLOY BULLETIN

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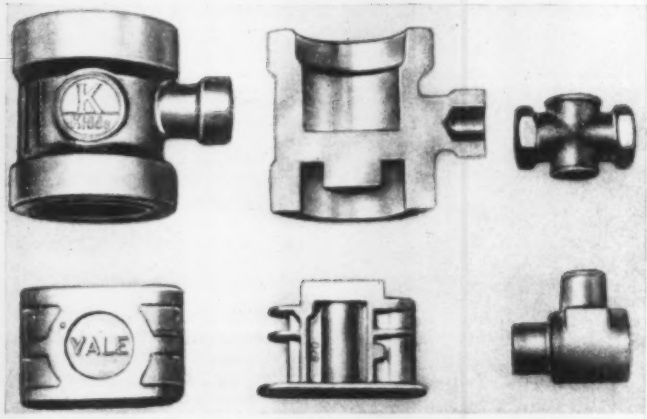
Cored Forgings Cut Machining Operations, Saves Critical Brass



Brass forgings with multiple coring: discharge head and cutaway to show coring; connector with four cores; lock case; lock body, three-core connector—courtesy National Cored Forgings Co., South Norwalk, Conn.

Long, deep cores on four sides in the same plane and a negligible flash substantially reduce the amount of metal needed to produce the illustrated brass forgings.

Through a process developed in Europe and brought to this country by National Cored Forgings Company, South Norwalk, Conn., dimensional accuracy of plus-minus 0.005 in. is maintained on all parts.

No Draft Necessary

High speed crank and screw presses are used in this process. Dies are of heat-resistant steels, as are the movable and fixed cores, and are of the split type. In this method no draft is used on either the dies or the punches eliminating many machining operations on the forging itself.

This forging operation is an extrusion and hot-pressing procedure and dense, porous-free forgings are produced.

Spud with hole straight through. Billet at right indicates small amount of metal needed for spud.

Billets are carefully weighed so that the metal weight, with the exception of a very thin flash, is the weight of the complete forging.

A good example of weight saving is seen in the discharge head in the upper left of the picture. The forging which was normally used weighed 4½ pounds. The illustrated forging weighs only 2½ pounds. The saving came through the coring which can be seen in the cut-away section next to the part.

Clean Finishes Obtained

Through careful applications of a parting medium, finishes on the forgings are clean as a diecast part.

At the bottom is seen a lock case which accurately takes the lock body next to it. Not only has weight been reduced but many machining operations have been eliminated through very close dimensions in the intricate contour.

The spud in the small illustration is shown with the billet used. To obtain the large, through hole, it was cored from two directions and then the thin web was pierced out as a secondary operation. This is only necessary on certain types of forgings.

Step cores and through cores are also possible.

All types of copper-base alloys suitable for forging can be worked within this coring process. (7347)

BRIDGEPORT FORGING ROD

	Bpt. Forging Rod 133	Naval Brass 24	Manganese Bronze 19	Muntz Metal 14	Duranze III 707	Silicon Bronze 632
ANALYSIS						
Copper %	59.50	60.0	58.5	59.75	91.0	97.03
Lead %	1.75	.15				2.85 Silicon
Tin %	.20	.75	0.75			0.12 Iron
Zinc %	38.55	39.1	39.45	40.25		
Iron %			1.0		7. Aluminum	
Manganese %			0.3		2. Silicon	
MECHANICAL PROPERTIES AS HOT FORGED						
Ten. Strength psi		60,000			90,000	60,000
Yld. Strength psi		25,000			45,000	24,000
Elongation % in 2"		35			30	70
Rockwell Hardness		B52			B85	B35
PHYSICAL CONSTANTS						
Melting Pt. (Liq) °F	1,640	1,650	1,630	1,660	1,810	1,895
Density, lbs/cu. in.	.305	.304	.302	.303	.278	.309
Coeff. Therm. Exp. per °F from 77°F to 572°F 6 x 10	11.5	11.7	11.8	11.6	9.2	9.3
Thermal Condue. Btu/sq. ft/ft/hr/°F @ 68°F	69	67	63	71	20	20
Elec. Cond. % IACS @ 68°F Soft	27	26	25	28	7	7

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

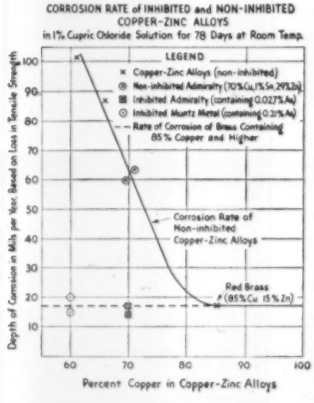
DEZINCIFICATION CORROSION (Cont'd)

Dezincification Can be Inhibited

Last month in this column it was shown that dezincification of the copper-zinc alloys in 1% Cupric Chloride solution is unlikely to occur when the copper content of the alloy is over 85%. Other corrosion tests, conducted in 1% Cupric Chloride solutions, revealed that a small percentage of arsenic or other inhibitors alloyed with brasses containing less than 85% copper increased their resistance towards dezincification.

The corrosion rate of the arsenical brasses tested dropped to approximately the same level as that of the uninhibited brasses containing 85% or more copper. The results of these corrosion tests are shown in the following figures where the dashed line is the corrosion rate for the copper-zinc alloys containing 85% or more copper. These data show that the addition of 1% of tin to brass (Admiralty metal —70% Cu, 29% Zn, 1% Sn), under the conditions of testing, has very little effect on the extent of dezincification. However, Admiralty metal containing 0.027% arsenic and Muntz metal (60% Copper, 40% Zinc) containing 0.21% arsenic were practically equal to red brass (85% Copper, 15% Zinc).

In connection with the subject of inhibitors, it is interesting to note that the alloying of arsenic to brasses containing more than 85% copper has very little effect on the corrosion rate in 1% Cupric Chloride solutions. While arsenic will inhibit dezincification in the brasses it will not inhibit other types of corrosion.


CORROSION RATE of INHIBITED and NON-INHIBITED COPPER-ZINC ALLOYS
in 1% Cupric Chloride Solution for 78 Days at Room Temp.
LEGEND
Copper-Zinc Alloys (non-inhibited)
Non-inhibited Admiralty (70% Cu, 1% Sn, 29% Zn)
Inhibited Admiralty (containing 0.027% As)
Inhibited Muntz Metal (containing 0.21% As)
Rate of Corrosion of Brass Containing 85% Copper and Higher
Corrosion Rate of Non-inhibited Copper-Zinc Alloys
Red Brass (85% Cu 15% Zn)
Depth of Corrosion in Mils per Year, Based on Loss in Tensile Strength
Percent Copper in Copper-Zinc Alloys

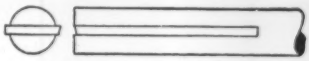
Boring-Burnishing Tool For Close-Tolerance Hole

Bearing insert with outside knurl to insure anchoring in casting and mirror-like bore with 0.003" tolerance (twice size).

Boring of brass bearings and sleeves in screw machines can be accomplished to close tolerances and excellent finish with a carbide boring-burnishing tool.

Using this type tool and free machining brass rod, one manufacturer maintained a tolerance of 0.0003" and produced a burnished surface on the I.D. of a ⅞" long bearing which was used as a casting insert.

The tool was made as follows: First, a slot was milled in a shank which was about 1/16" smaller than the bore. In the centerline was inserted a piece of carbide wider than the bore desired; in this case ⅛" thick and 1¼" long.



Boring-burnishing tool used to produce bearing diameter in screw machine. Courtesy The Waterbury Screw Machine Products Company, Waterbury, Connecticut.

The carbide was then radially ground to the diameter of the finished bore. Next, one lip was ground with front and side clearances. The opposite side, with the original radius, served as the burnishing tool. The cutting edge was broken with a diamond stone to insure a smooth cut.

For finishing, 0.004 to 0.006" was left in the hole. Fine feed and high speed were used.

In this work, the tool insert should be longer than the hole being bored. For larger holes, wider difference between shank and insert provides chip clearance.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Sheet Metal Joiner seams sheets of any thickness from 16 to 30 gage at speeds up to 8 feet every 40 seconds. Work is placed on long grooved anvil. Roller assembly—powered by 2 hp motor—travels along screw over work once in each direction. Pressure, derived from force exerted by roller assembly against overhead steel beam, is said to reach 11,000 psi. **No. 1179**

Optical Straightedge utilizes beam of light as straightline reference and is said to detect deviations as small as ± .00005" in flat surfaces. Unit consists of lens and prism housing and a feeler microscope which rides along surface. Relative positions of two indices, observed through microscope, indicate surface deviations. The instrument is available in four sizes with approximate lengths of 3, 5, 10 and 13 feet. **No. 1180**

Automatic Press Feeder handles stock up to 2" wide and 0.045" thick. Mounted directly on die set, the unit has a maximum feed of 2" on presses with 1½" or greater stroke, and 1⅜" on 1" stroke presses. The completely adjustable feed is controlled by press movement. **No. 1181**

Geared Motor contains two secondary pinions which drive the output gear. This reportedly doubles its effective torque rating when compared with conventional single pinion drives. Made in sizes from 5 to 25 hp, with speeds from 30 to 84 rpm, the motor incorporates a splined herringbone pinion to divide the load equally between the two secondary pinions. **No. 1182**

Rotary Indexing Table is said to be especially proportioned for bench mill, shaper or drill press. The unit is equipped with three index plates, each having six circles of holes. Table is 6¼" in diameter, 2⅝" high. **No. 1183**

Remote Voltage Control is a foot-pedal-operated variable resistor for most d-c arc welders and some a-c types. Voltage can be varied instantly during welding, giving the operator proper welding heat for various steps in fit-up and position. Arc can be extinguished at completion of the weld to avoid cratering. **No. 1184**

Pantographic Roll Engraver mills, routs and engraves completely around cylinders and rolls from 6 to 12 inches in diameter and up to 40 inches long. Maximum area covered by cutter at one setting is reportedly 5 x 20 inches. Power is provided by ½ hp variable speed motor, which drives heavy-duty spindle at speeds from 500 to 12,000 rpm. **No. 1185**

Sound Level Meter is extremely light and compact—easily held in one hand. Built with sub-miniature tubes and components, the unit operates on hearing-aid batteries. The sound-level range is said to be from 34 to 140 db above the ASA reference level of 0.0002 dynes per square centimeter. **No. 1186**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL
"Bridgeport" BRASS
BRIDGEPORT BRASS
BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865
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justable-voltage control is installed on the first of two massive 200-ton gantry cranes built by the Judson Pacific-Murphy Corp., Emeryville, Calif. These cranes will be used to raise and lower the 126-ton spillway gates at the dam. When a gate is raised, the load on the crane approaches twice the weight of the gate, because of the downward pressure of the water rushing under it.

Each crane is 60 feet long, 42 feet wide, and towers 77 feet above the top of the dam. Mounted on 16 wheels, the giant cranes move along the top of the dam on rails.

Adjustable-voltage control embodies speed-torque characteristics that inherently cause the motor to slow down in both the hoisting and lowering cycle when the load is increased without change in the setting of the control. The control monitors the load on the motor, and adjusts the speed accordingly, using a Rototrol rotating regulator. The system provides a stalling torque of 200 per cent of full-load torque, thus limiting maximum mechanical and electrical stresses.

Direct current motors for the main hoist, trolley and bridge drives are powered through a four-unit motor-generator set mounted in the machinery house on the main trolley atop each crane. The set converts 440v ac power to dc. For simplicity of design and operation, the dc voltage is controlled by the generator fields, rather than by resistors in series with the motors. Solenoid brakes assist in spotting the load and in holding the trolley and hoist drives.

Despite the heavy loads handled by the cranes, the main hoist motor is only 60 hp. This power, transmitted through an extensive gear train, permits a maximum speed of 4 feet per minute when the main hoist is under full load handling the spillway gates.

Tuning Cores Pressed Quickly

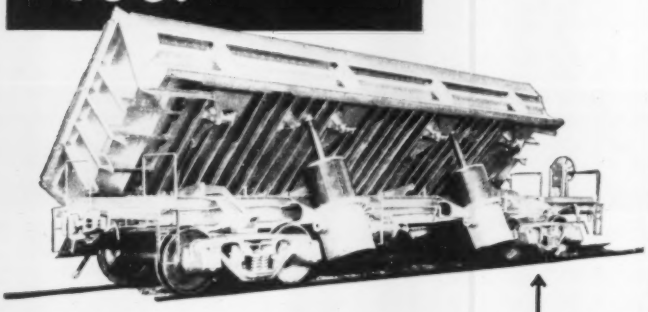
Automatic Mfg. Corp., Newark, N. J., manufacturers of radio and television components, uses three DDS-2 rotary powder metal presses built by F. J. Stokes Machine Co., Philadelphia, to make all tuning cores for their intermediate frequency transformers. Automatic installed its first powder metal press in 1945. From an initial production of 1000 tuning cores per hour, the company now produces over 10,000 per hour of these powder metal parts.

To make these tuning cores, the

Waterfall Cools Turbine Wheel

CASCADING down the 30-foot length of a turbine shaft at General Electric Co.'s turbine divisions in Schenectady, N. Y., is an industrial waterfall that plays a big part in shrink fitting the wheel to the shaft. Wheel is heated in an oven so that bore will expand and then placed on the main shaft and lowered into position. Cooling by air and water shrinks it tight. An inspector then checks the fitting of the keys and position of wheel on shaft

BOOSTS EARNINGS TOO!



The Differential Air Dump Car has a way with operating expenses — cuts 'em down!

There's another pair of massive muscles on the other side of the car, too, means two-way dumping and greater flexibility.

They're built to take rough treatment — whether it's the slam-banging of the clam or the sudden dumping of tons of hot slag. These cars can take it and can come back faster for more.

Higher ratio of payload to dead weight! Fewer trips to the shop and shorter stays when they do go! Add all these up and it spells lower operating costs — another way to say "Boosted Earnings". Write for the full story on these cars.

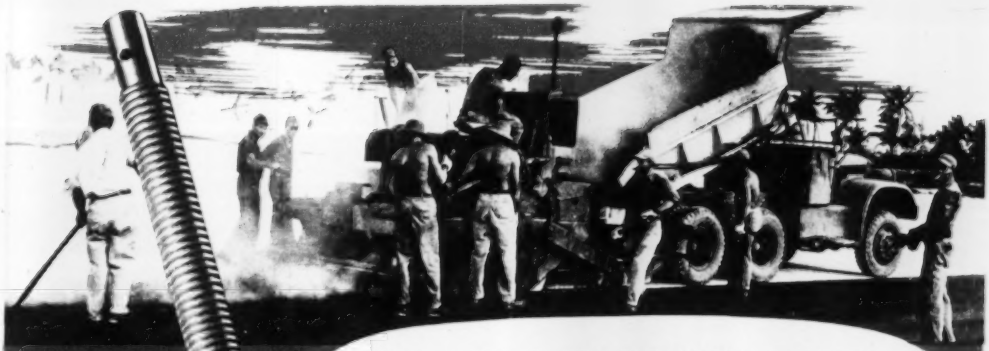
DUMPS BOTH WAYS

Other Differential Products: Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO

SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT



This thickness control screw, made from STRESSPROOF steel bar, is a vital part of the asphalt road layer shown laying on air strip at a Pacific base.

COSTS DOWN 25%
PRODUCTION UP 100%

WHEN STRESSPROOF REPLACED HEAT-TREATED .40 CARBON ALLOY STEEL BARS

- *Speeded Machining 50% to 100%*
- *Eliminated need for Heat Treated Alloy Bars*

In this asphalt road layer, instead of using a heat-treated, hot-rolled .40 carbon alloy bar, STRESSPROOF was specified. STRESSPROOF provided *in-the-bar* the necessary strength and wear resistance, and machined so much easier that production time was cut in half.

STRESSPROOF's unique combination of four important qualities *in-the-bar* is cutting costs and speeding production on many similar defense jobs. STRESSPROOF is twice as strong as ordinary cold-finished bars. Its resistance to wear often makes carburizing unnecessary. It is stress-relieved to minimize distortion, and has *in-the-bar* machinability fully 50% better than heat-treated alloys of the same hardness. Yet STRESSPROOF is less expensive than all cold-finished and most hot-rolled alloy steel bars that have been fully heat treated.

STRESSPROOF is also available with a Ground and Polished finish.

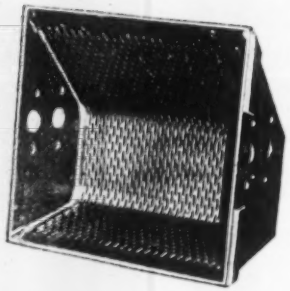
LASALLE STEEL CO.
1414 150th Street, Hammond, Indiana
Manufacturers of the Most Complete Line of Cold-Finished and Ground and Polished Bars in America

LaSalle
STRESSPROOF®
SEVERELY COLD-WORKED, FURNACE-TREATED CARBON STEEL BARS

STRESSPROOF IS PLAYING A VITAL ROLE IN NATIONAL DEFENSE!

A very large proportion of STRESSPROOF production, today, is going into defense jobs. However, from time to time sample bars may be available for testing purposes.

Typical of Hendrick's
Manufacturing Facilities



Hendrick is exceptionally well equipped to manufacture to specifications a wide range of metal products that involve such operations as perforating, shaping, forming, welding, brazing, riveting, etc. The perforated elevator bucket illustrated is typical of the many specialized articles for whose fabrication Hendrick has unusual facilities. Write us in detail regarding any metal product you desire fabricated.

1876—SEVENTY-FIFTH ANNIVERSARY—1951

SEE OUR CATALOG IN SWEET'S

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Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
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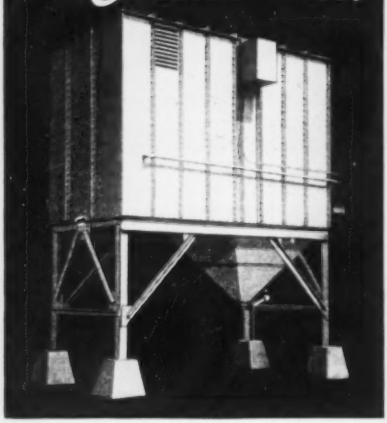
Shur-Site Treads, Armorgrids

Control Dust



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RUEMELIN TUBULAR TYPE FILTER

A Ruemelin Tubular Type Cloth Filter is the modern way to handle industrial dusts created in foundry cleaning rooms, metal working plants, cement mills and many other applications. The simplicity of Ruemelin Dust Filter design means low operating and maintenance costs. Definite power savings are assured by lower resistance to air flow.

NEW DUST FILTER BULLETIN AVAILABLE

Write for our new Bulletin No. 24-D just released. Learn for yourself the advantages you secure with a Ruemelin Bag Filter and at no extra cost.

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MANUFACTURERS AND ENGINEERS
SAND BLAST AND DUST COLLECTING EQUIPMENT
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A-5881-4R

company combines finely divided iron powder with a phenolic resin, which acts as a binder and insulator. The iron powder and resin are mixed together in a suitable mixer and the putty-like mass is granulated first in a hammermill and then in a granulator. This classified powder is then pressed. The resin is cured, and threads are ground on the outer periphery of the core.

The press assures accuracy of weight by overfilling each die cavity and scraping off excess material, as well as by the design of the weight adjusting mechanism. Application of pressure simultaneously from both top and bottom gives uniform density throughout the piece.

Sets Two Nuts at Once

Two new double Clinchor units have been furnished to Ternstedt Division, General Motors Corp., Detroit, by Tomkins-Johnson Co., Jackson, Mich. The machines are tooled to feed and set two $\frac{3}{8}$ x $\frac{1}{2}$ x 3/16-inch thick Fabri-Steel nuts at each operation. The anvil position of the left hand Clinchor is adjustable in a front-to-back direction, and also with respect to height. The anvil position of the right hand Clinchor is adjustable in a left-to-right direction.

Welding Alloys Chart Issued

A new chart of Eutectic Low Temperature welding alloys, measuring 10 x 14 inches, suitable for wall hanging or for purchasing department files, has been issued by Eutectic Welding Alloys Corp., Flushing, N. Y. The chart contains detailed specifications on close to 200 metal-joining alloys including bonding temperatures, tensile strengths, etc.

Major listings show proper welding alloys for use with cast iron, steel, stainless steels, copper, brass, bronze, nickel and nickel alloys, aluminum and aluminum alloys, magnesium alloys and zinc die castings as well as for hard overlaying, cutting, chamfering, piercing, gouging and joint preparation of all metals.

Power Brushing Saves a Step

By combining two production processes into one automatic brushing operation a manufacturer of razor blades is effecting sizable dollar savings and getting better finishes. Heat treat scale is removed and the strip prepared for name etching by power brushes made by Osborn Mfg. Co., Cleveland. The change came about after the razor blade manufacturer found the former method was too expensive and called in Osborn brush specialists.

The two jobs formerly were done

DO YOU HAVE A HOT DESIGN PROBLEM?

then consider..... HIGH STRENGTH at HIGH TEMPERATURE . . .

KENTANIUM

You can really put the heat on this material! It's new. It's distinctive—in properties and performance. It withstands high temperature punishment that quickly weakens and disintegrates conventional heat-resistant materials. It goes through a "fiery furnace" and comes out practically "unscaled" . . . resists oxidation up to 2200°F over long periods, and up to 4500°F for short exposures. Shows no weakening when subjected to the thermal shock of alternate heating and cooling from 1800°F to 180°F in one minute cycles for 100 hours continuously while under tensile stress of 12,500 p.s.i. Superior to best currently-used alloys in stress rupture characteristics from 1500°F up. Much lighter than steels or conventional alloys—a property especially valuable for rotating parts.

KENTANIUM CONTAINS NO TUNGSTEN OR COBALT

Kentanium — our own exclusive development — is chiefly titanium carbide (small percentages of other refractory metal carbides) with nickel "binder." *Uses neither tungsten nor cobalt.* Can be had in various sintered forms—extruded rods, tubes, squares, and flats—simple molded shapes—or more intricate forms that are machined from pressed powder slugs. Not heat-treatable . . . can be worked after sintering only by grinding, to produce required dimensional tolerance or surface finish. Several "grades" are available, with properties to meet specific combinations of imposed conditions.

☆ *If you're sweating over a hot design problem that has you stopped cold, perhaps Kentanium can come to your rescue with possibilities for providing longer life and greater efficiency. We invite your inquiries. Our engineers will be glad to work with you in determining the applicability of Kentanium to your design projects.*

KENNAMETAL Inc.
LATROBE, PA., U. S. A.
SUPERIOR CEMENTED CARBIDES

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take a CLOSER LOOK at

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1. Mechanical and pressure tubing.
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5. Sizes up to 9⅝" OD in full range of wall thicknesses.
6. Wide choice of surface finishes—as rolled, as drawn, turned, scale-free, and polished.
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B&W STAINLESS and WELDED TUBES

TA-1637G

by machines having six brushing heads. Power brushing and improvements in hardening techniques enable the manufacturer to use a two station automatic machine that does both operations simultaneously. Razor blade strip is pulled through brushes rotating at 3450 rpm at 50 feet per minute. Bevel gears move the brushes up or down as required. Brush life is extended by reversing them as they become grooved from wear.

Materials Handling Facts Given

Efficient handling of raw and finished materials, their proper storage and how modern materials handling machines can expedite manufacture to cut costs, save time and money, is the theme of a booklet, "Basic Facts About Materials Handling," published by Clark Equipment Co. How to combine small units into big ones for more efficient handling, how to route materials, how to utilize overhead space for storage, how to use trailer trains and how to best make use of a limited manpower force are a few of the subjects discussed.

The publication also discusses the latest equipment in the materials handling field, and how to figure costs of its use. Cost analysis information includes how to figure amortization of machine investment, fixed charges and the variable charges that change from job to job. It is a simple way to determine the economic advantages of modern handling equipment in almost any given situation.

Making the best use of existing machines through utilization of attachments, and multiple usage, is covered also, as are the possibilities of powered hand trucks. Copies of the booklet will be sent in response to requests directed to the Clark Equipment Co., Industrial Truck Division, Battle Creek 62, Mich.

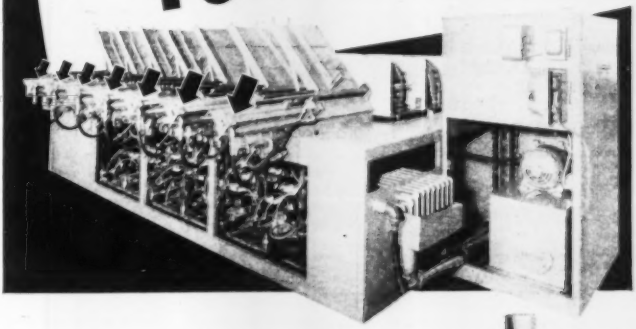
Steam Costs Computed

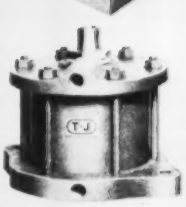
A slide rule type calculator designed to provide a ready means of computing steam costs has been made available by the Cleaver-Brooks Co., Milwaukee, manufacturer of steam boilers and other equipment for the generation and utilization of heat. The pocket size calculator, is available without cost to engineers, plant executives and those who will find it useful in their work. It enables the user to compute the comparative steam costs per 1000 pounds using coal, oil or gas—and based on fuel costs of price per ton, price per gallon and price per cubic foot.

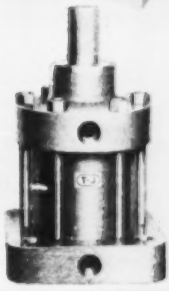
The steam cost calculator takes into account the efficiency of the system. Users of the steam cost calcu-

Job File No. 3259

Feeds Automatically WITH T-J CYLINDERS







T-J Hydraulic Cylinders furnish efficient, automatic "push power" for feeding devices in this new Ajax-Northrup induction forge heating equipment.

This unit—manufactured by Ajax Electrothermic Corp., Trenton, N. J.—automatically heats steel forging stock in sizes ranging from 1 to 4 inches (rounds or squares) at 2250°F. at rate of 7500 to 8500 lbs. per hour. Has space for 8 heating stations . . . each with *hydraulically operated billet feeding devices employing T-J Cylinders.* These cylinders also eject heated bars automatically. Induction heating with this equipment results in uniformity of successive billets fed to the forge—thus controlling quality of finished forgings and reducing rejects.

Do you have a tough job in power movement—pushing, pulling or lifting? Let T-J help you *simplify machines, save labor* and *cut costs* by using T-J Air or Hydraulic Cylinders! Many standard sizes and styles . . . cushioned or non-cushioned . . . 100 lb. or 50,000 lb. Precision-built, long life. Write for more information. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVEMENT IN ANY DIRECTION

100 LBS. or 50,000 LBS.

35 YEARS EXPERIENCE

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

T-J

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ELECTROMET *Data Sheet*

Published by Electro Metallurgical Company, A Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

ALLOYS FOR THE STEEL, IRON, AND NON-FERROUS INDUSTRIES

BOREON ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Ferroboron Min. 10.00% Boron Grade	Silicon.....max. 1.50% Aluminum.....max. 0.50% Carbon.....max. 1.50%	Increases hardenability of steel; also, for additions to malleable iron and aluminum alloys.
Min. 17.50% Boron Grade	Silicon.....max. 1.50% Aluminum....max. 0.50% Carbon.....max. 0.50%	
Manganese-Boron	Boron.....min. 17.50% Manganese...approx. 75% Silicon.....max. 1.50% Carbon.....max. 3% Iron.....max. 5%	Used to cleanse and deoxidize non-ferrous alloys.
Nickel-Boron	Boron.....15 to 18% Silicon.....max. 1.50% Aluminum.....max. 1.00% Carbon.....max. 0.50% Iron.....max. 3.00% Nickel.....Balance	Special boron alloy used principally for deoxidizing nickel and its alloys.
Boron Carbide	Boron.....45 to 50% Carbon .....45 to 50%	Deoxidizer for non-ferrous alloys.
Calcium Boride	Boron.....38 to 42% Calcium.....27 to 32% Carbon.....15 to 20%	Welding rod coating.
SILCAZ Alloy	Boron.....0.55 to 0.75% Silicon.....35 to 40% Calcium.....9 to 11% Aluminum.....6 to 8% Titanium.....9 to 11% Zirconium.....3 to 5%	A complex boron addition agent for increasing the hardenability of steel.

CALCIUM ALLOYS

Calcium-Silicon	Calcium.....30 to 33% Silicon.....60 to 65% Iron.....1.50 to 3%	Deoxidizer for quality ingot steel. Also used in high-tensile gray irons.
Calcium-Manganese-Silicon	Calcium.....16 to 20% Manganese.....14 to 18% Silicon.....53 to 59%	A complex deoxidizer used widely in production of steel castings.
Calcium Metal		Reducing agent in metallurgical applications, deoxidizer and degasifier for non-ferrous metals, particularly magnesium.
Regular Grade	Calcium.....98% (Cylinders, Slabs, Cut Pieces, or Turnings)	
Distilled Grade	Calcium...approx. 99.90% (Irregular pieces from pea size to 14 in. lumps)	For special applications requiring calcium of very high purity.

CHROMIUM ALLOYS

Low-Carbon Ferrochrome	Chromium.....67 to 71% Silicon.....0.30 to 1.00% Carbon (10 Grades) max. 0.03 to max. 2.00%	Production of stainless steels and high-temperature alloys requiring low carbon content.
High-Carbon Ferrochrome		
Max. 4.50, 5.00, or 6.00% Carbon Grade	Chromium.....67 to 70% Silicon..... 1 to 2%	For production of engineering alloy steels and other alloy steels of moderate chromium content.
Max. 7.00% Carbon Grade	Chromium.....66 to 69% Silicon..... 1 to 3%	
Min. 7.00% Carbon Grade	Chromium.....65 to 68% Silicon..... 1 to 3%	
Nitrogen-Bearing Low-Carbon Ferrochrome	Chromium.....67 to 71% Silicon.....0.30 to 1.00% Carbon.....max. 0.10% Nitrogen....approx. 0.75%	For additions of nitrogen to improve properties of high-chromium steels.
"SM" Ferrochrome	Chromium.....60 to 65% Silicon ..... 4 to 6% Carbon..... 4 to 6% Manganese..... 4 to 6%	A high-solubility chromium addition for steel or iron in either furnace or ladle.

CHROMIUM ALLOYS cont.

Foundry Ferrochrome High-Carbon Grade	Chromium.....62 to 66% Silicon..... 7 to 10% Carbon..... 5 to 7%	Developed especially for high-solubility ladle additions of chromium to improve composition and properties of cast iron.
Low-Carbon Grade	Chromium.....50 to 54% Silicon.....28 to 32% Carbon.....max. 1.25%	
Chromium Metal Low-Carbon Grades	Chromium.....min. 97% Carbon .....max. 0.10% and 0.50% Iron.....max. 1%	Production of wide variety of non-ferrous chromium-bearing alloys, including electrical resistance alloys and high-temperature alloys.
High-Carbon Grade	Chromium.....87 to 90% Carbon..... 9 to 11% Iron.....max. 1.25%	
"EM" Ferrochrome-Silicon No. 1 Grade	Chromium.....39 to 41% Silicon.....42 to 46% Carbon.....max. 0.05%	In production of stainless steels, these alloys are used to reduce metal oxides from the slag back into bath.
No. 2 Grade	Chromium.....36 to 39% Silicon.....36 to 39% Carbon.....max. 0.05% Aluminum..... 7 to 9%	
"EM" Ferrosilicon-Chrome	Chromium.....50 to 54% Silicon.....28 to 32% Carbon.....max. 1.25%	For adding chromium and silicon to steels containing up to 1 or 2 per cent chromium.
"EM" Chromium Briquets (Hexagonal Shape)	Chromium.....2 lb. Total Weight.....3⅛ lb.	For adding chromium to cast iron in the cupola.

COLUMBIUM ALLOYS

Ferrocolumbium	Columbium.....50 to 60% Silicon.....max. 8% Carbon.....max. 0.40%	Stabilizer in austenitic chromium-nickel stainless steels. Also constituent of high-temperature alloys.
Ferrotantalum-Columbium	Columbium...approx. 40% Tantalum.....approx. 20% Cb+Ta .....min. 60% Silicon.....4 to 6% Carbon.....max. 0.30%	Another stabilizer, used to supplement ferrocolumbium, in austenitic chromium-nickel stainless steels. Also used in high-temperature alloys.

MANGANESE ALLOYS

Standard Ferromanganese Regular Grade	Manganese.....78 to 82% Carbon.....approx. 7% Silicon.....max. 1%	Most common means of adding manganese to steel for both alloying and deoxidizing purposes. Also for counteracting sulphur in steel and cast iron.
Low-Phosphorus Grade	Manganese.....78 to 82% Carbon.....max. 7% Silicon.....max. 2% Phosphorus...max. 0.10%	
Low-Carbon Ferromanganese Low-Phosphorus Grade	Manganese.....min. 90% Carbon.....max. 0.07% Phosphorus...max. 0.06%	Additions of manganese to steels of low-carbon specification, particularly stainless steels of 18 per cent chromium, 8 per cent nickel type.
Regular Grades	Manganese.....85 to 90% Carbon....max. 0.07, 0.11 to 0.15, 0.30, or 0.50%	
Regular Grade (High-Silicon)	Manganese.....80 to 85% Carbon.....max. 0.75% Silicon..... 5 to 7%	
Medium-Carbon Ferromanganese	Manganese.....80 to 85% Carbon.....max. 1.25 to 1.50%	For making low- and medium-carbon manganese steel and Hadfield steel.
Silicomanganese		
Max. 1.50% Carbon Grade	Manganese.....65 to 68% Silicon.....18 to 20%	A versatile alloy useful as furnace block, deoxidizer, and also for making manganese additions to steel in the ladle or in the furnace.
Max. 2.00% Carbon Grade	Manganese.....65 to 68% Silicon.....15 to 17.50%	
Max. 3.00% Carbon Grade	Manganese.....65 to 68% Silicon.....12 to 14.50%	

*All of the alloys and metals listed are produced in the usual lump, crushed, or ground sizes, except where other special forms are indicated.

PRODUCT*	NOMINAL COMPOSITION	USES
MANGANESE ALLOYS cont.		
Low-Iron Ferromanganese	Manganese.....85 to 90% Carbon.....approx. 7.00% Silicon.....max. 3% Iron.....max. 2%	For high manganese additions to certain non-ferrous alloys, particularly aluminum.
Manganese Metal	Manganese.....min. 96% Carbon.....max. 0.20% Silicon.....max. 1.00% Iron.....max. 2.50%	Used both as deoxidizer and alloy in production of numerous non-ferrous metals and alloys.
"EM" Silico-manganese Briquets (Square Shape)	Manganese.....2 lb. Silicon.....½ lb. Total Weight.....3½ lb.	For adding manganese (with silicon) to cast iron in the cupola.
"EM" Ferro-manganese Briquets (Oblong Shape)	Manganese.....2 lb. Total Weight.....3 lb.	For adding manganese (without silicon) to cast iron in the cupola.
SILICON ALLOYS		
50% Ferrosilicon		
Regular Grade	Silicon.....47 to 51%	Deoxidizer for most grades of killed or semi-killed steel. Blocking grade specially sized for maximum efficiency.
Blocking Grade	Silicon.....47 to 51%	
Low-Aluminum Grade	Silicon.....47 to 51% Aluminum.....max. 0.40%	
65% Ferrosilicon		
Low-Aluminum Grade	Silicon....61.50 to 66.50% Aluminum.....max. 0.50%	Mainly for production of electrical sheet steel.
75% Ferrosilicon		
Regular Grade	Silicon.....73 to 78%	Deoxidizer and alloy for production of high-silicon spring and electrical sheet steel. Graphitizing inoculant for cast iron.
Low-Aluminum Grade	Silicon.....73 to 78% Aluminum.....max. 0.50%	
85% Ferrosilicon		
Regular Grade	Silicon.....83 to 88%	Enables melter to add higher percentages of silicon without chilling metal in ladle. Graphitizing inoculant for cast iron.
Low-Aluminum Grade	Silicon.....83 to 88% Aluminum.....max. 0.50%	
90% Ferrosilicon		
Regular Grade	Silicon.....92 to 95%	Permits large additions of silicon without harmful chilling effect.
Low-Aluminum Grade	Silicon.....92 to 95% Aluminum.....max. 0.50%	
Silicon Metal		
Regular Grade	Silicon.....min. 97 or 98% Iron.....max. 1 or 2%	Additions of silicon to non-ferrous metals, particularly aluminum and copper, to improve physical properties.
Purified Grade	Silicon....99.70 to 99.90% Iron.....005 to .015%	For applications in non-ferrous industry requiring silicon of high purity.
Low-Calcium Grade	Silicon.....min. 97% Iron.....max. 1% Calcium.....max. 0.10%	For the production of high-silicon aluminum alloys where calcium is detrimental.
Low-Aluminum Grade	Silicon.....min. 98% Iron.....max. 1% Aluminum.....max. 0.10%	For the production of silicon-copper alloys where aluminum is detrimental.
"SMZ" Alloy	Silicon.....60 to 65% Manganese..... 5 to 7% Zirconium..... 5 to 7%	Particularly strong graphitizing inoculant used in making ladle additions to cast iron.
Special Graphitizer	Ferrosilicon Compound	Acts as both deoxidizer and graphitizer in cast iron. Useful in controlling chilling tendencies.
Magnesium-Ferrosilicon	Silicon.....approx. 46% Magnesium..approx. 8.5%	For ladle addition to cast iron to obtain special properties.
Barium-Silicon	Barium.....40 to 50% Silicon.....45 to 55%	For deoxidation of non-ferrous alloys.
"EM" Silicon Briquets (Cylindrical Shape)		
Large Size	Silicon.....2 lb. Total Weight.....5 lb.	For adding silicon to cast iron in the cupola.
Small Size	Silicon.....1 lb. Total Weight.....2½ lb.	

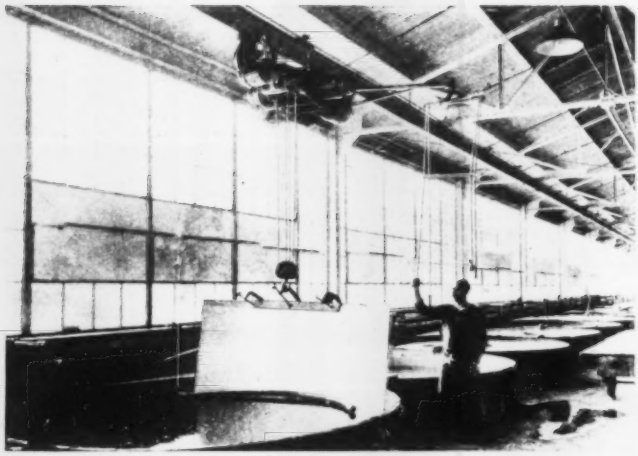
"Electromet," "EM," "Silcaz," "SM," and "SMZ," are trade-marks of Union Carbide and Carbon Corporation.

PRODUCT*	NOMINAL COMPOSITION	USES
TITANIUM ALLOYS		
Ferrotitanium	Titanium.....27 to 32% Carbon.....max. 0.10%	For adding titanium to stabilized austenitic chromium-nickel stainless steels and to high-temperature metals.
Silicon-Titanium	Titanium.....40 to 50% Silicon.....45 to 50% Iron.....max. 3%	For additions of titanium to steels or non-ferrous alloys.
Manganese-Nickel-Titanium	Titanium.....43 to 48% Nickel.....approx. 25% Manganese.....max. 8% Aluminum.....max. 18% Iron.....max. 5% Silicon.....approx. 2% Carbon.....max. 0.15%	Deoxidization of nickel alloys.
TUNGSTEN ALLOYS		
Ferrotungsten	Conforming to A.S.T.M. Spec. A 144-39	For production of tool and die steels; also high-temperature alloys.
Tungsten Metal Powder		
Melting Grade	Tungsten.....min. 98.80% Total Carbon..max. 0.25%	Production of tungsten steels and cast tungsten carbide.
VANADIUM ALLOYS		
Ferrovanadium	Vanadium.....50 to 55% Carbon....max. 0.20, 0.50, or 3.00% Silicon....max. 1.50, 2.00, or 8%	Production of tool and engineering steels, high-strength structural steels, non-aging rimming steels, and wear-resistant irons.
Vanadium Oxide Fused	V_2O_5.....86 to 89% Na_2O.....approx. 10% CaO.....approx. 2%	For addition of vanadium to steel and for manufacturing catalysts.
Sodium Polyvanadate (Red Cake)	V_2O_5.....approx. 85% Na_2O.....approx. 9% CaO.....approx. 2% H_2O.....approx. 2.5%	For manufacture of vanadium compounds, including vanadium catalysts.
High-Purity Ammonium Metavanadate	V_2O_5.....approx. 99.50% NH_4VO_3.....min. 99%	
ZIRCONIUM ALLOYS		
12 to 15% Zirconium Alloy	Zirconium.....12 to 15% Silicon.....39 to 43% Carbon.....max. 0.20%	This zirconium alloy is a powerful deoxidizer. It also increases depth of hardening.
35 to 40% Zirconium Alloy	Zirconium.....35 to 40% Silicon.....47 to 52% Carbon.....max. 0.50%	Deoxidizer for fine grades of alloy steels. Used for adding larger amounts of zirconium.
Nickel-Zirconium	Zirconium.....25 to 30% Nickel.....40 to 50% Aluminum....approx. 15% Silicon.....max. 10% Iron.....max. 5%	Effective for deoxidizing and degasifying nickel and its alloys.

IF YOU HAVE A METALS PROBLEM

More than 50 different alloys and metals are produced by ELECTROMET in hundreds of varying compositions and sizes. If you need help in selecting the proper alloys, or have some specific metallurgical problem, be sure to consult one of ELECTROMET'S specially trained metallurgists and engineers. Address your inquiries to one of the offices listed below.

Birmingham 3, Ala.....Brown-Marx Building
Chicago 1, Ill.....230 N. Michigan Avenue
Cleveland 14, Ohio.....Union Commerce Building
Detroit 2, Mich.....6-240 General Motors Building
Los Angeles 58, Calif.....2724 Leonis Boulevard
New York 17, N. Y.....30 East 42nd Street
Pittsburgh 22, Pa.....2207 Oliver Building
San Francisco 6, Calif.....22 Battery Street
In Canada: Electro Metallurgical Company of Canada Limited, Welland, Ontario



How to keep a hoist from growing old before its time!

The time to add years to the life of your hoist is *before you buy it!*

You can do this and avoid costly production slow-downs later if, before you buy, you estimate what the maximum and average loads are to be; how frequently your hoist will be called upon to handle those loads within a given period.

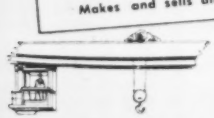
You will also want the answers to these questions: What distance is the load to be lifted and lowered, and at what speeds? How quickly must the hoist travel from one location to another to keep production at top efficiency? What temperatures are likely to prevail? Are there any corrosive influences? . . . and many others.

You can save your time now, and considerable trouble later, by asking a Shepard Niles specialist to study your problem and recommend the most economical hoist for you—in terms of your own specific operations. We invite your inquiries.

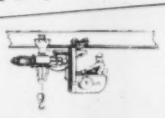
Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads



CRANES • Overhead



HOISTS • Cab Operated

HOISTS • Floor Operated

358 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

lator can easily determine the costs of operating a Cleaver-Brooks steam boiler as compared with other types of oil, gas or coal-fired equipment.

Nickel Capacity Expanded

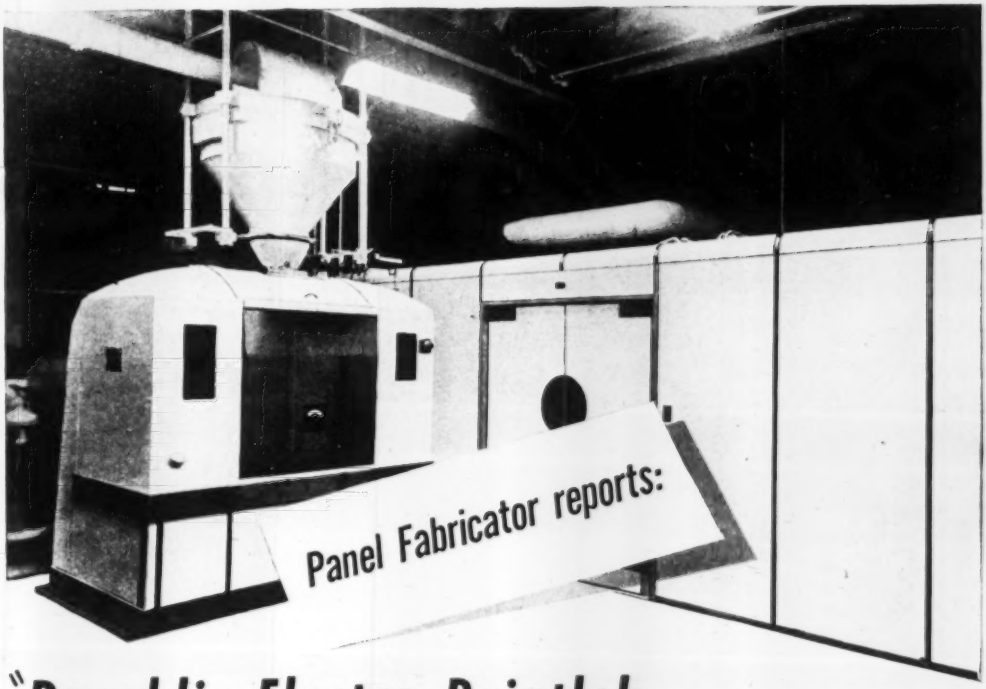
Simultaneous completion of two projects by International Nickel Co. of Canada Ltd.—a new shaft and a new concentrator at its Creighton mine. Total expenditures of $17 million are involved in the projects, says R. Leslie Beattie, vice-president and general manager of Canadian opera-

CONCENTRATOR GRINDING AISLE
. . . handles 10,000 tons of ore per day

tions. The shaft brings to 13 the number of operating shafts in underground mines in the Sudbury district. The mill, which concentrates ore before transportation to the smelter at Copper Cliff, Ont., has a capacity of 10,000 tons of ore a day.

Additional underground ores will serve as replacement of open pit ores and will enable the company to continue refined nickel production capacity at the present rate of about 250 million pounds per year. When designed in 1948, the mill was to have a daily capacity of 6000 tons, but plans were changed two weeks after the outbreak of hostilities in Korea to accommodate the additional tonnage.

Now in full operation, the two projects are described by Mr. Beattie as being "part of our extensive program of underground mine development launched during World War II in anticipation of the depletion of our open pit surface mine which contributed substantially to nickel production during the war and since. Including these completed projects, the program has already involved capital expenditures of more than $100 mil-



"Republic Electro Paintlok puts an end to *paint peeling!*"

● "Not one single instance of paint peeling off panels in five years," reports this manufacturer after switching to Republic Electro Paintlok for Process Air-Conditioning Room panels.

Yes, Republic Electro Paintlok really takes a tight grip on paints, lacquers and synthetic enamels . . . and holds that grip through years of service. It was developed specifically for that purpose—*to offer lasting paint adherence on a zinc-coated steel surface.* As a result, this chemically-treated, zinc-coated sheet steel helps keep these panels clean and bright. Even when the paint film is accidentally scratched or broken, the zinc coating retards the spread of underfilm corrosion.

The complete story is detailed in Booklet 525. Write for your free copy today.

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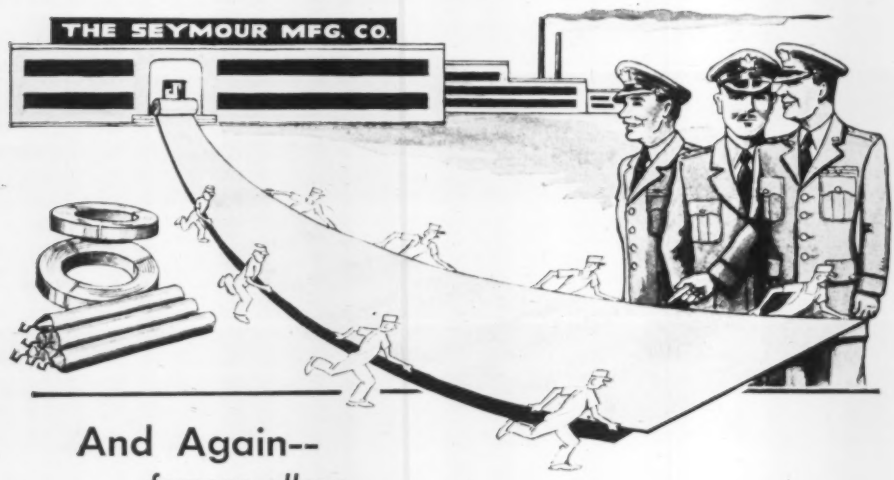
Other Republic Products include Carbon, Alloy and Stainless Steels—Sheets, Strip, Plates, Bars, Pipe, Tubing, Bolts and Nuts, Wire

Again we roll out the "carpet" to our nation's defenders



And Again--

famous alloys become ALLIES!

Here at Seymour it is again "open house" to the War Department! Nickel Silver, Phosphor Bronze, Brass, Anodes, and other products for which the name SEYMOUR has been famous in industry since 1878, are now on top priority for use in guns, planes, trucks, ships and a thousand other pieces of war equipment.

In combat, enemies other than human must be reckoned with. These are Rust, Corrosion, Wear, Fatigue. In Seymour Nickel Silver and Phosphor Bronze, such qualities as high corrosion resistance, ability to undergo millions of flexures without failure, great strength and resilience, become valiant "fighters" — helping not only to rout the aggressors but also to protect our own soldiers.

* * *

Domestic orders are being taken and filled as rapidly as possible. To save time, please contact nearest Seymour Distributor.

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SEYMOUR NICKEL ANODES & Bright Nickel

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SEYMOUR

Nonferrous alloys since 1878

tion. When the program is completed in 1953, the company's underground mines will be able to deliver 13 million tons of ore annually, compared with 5.7 million tons of underground ore hoisted in 1950".

Models Solve Problems—Problem of mining ores from the lower grade sections at Creighton was complicated by the fact that higher grade ores had previously been removed from the areas below the lower grade ores, according to Mr. Beattie. Old mine openings interfered with an orderly arrangement of opening for the new program. This and many other problems were solved by using models built to scale and embodying the factors anticipated in actual underground mining.

Extensive laboratory, pilot plant and operational scale test work preceded designing in 1948 of the Creighton concentrator. With the near doubling of capacity long after construction had started, plans and construction procedures had to be revised without interfering with building in progress and yet put the plant in operation ahead of schedule.

Using an Old Timer—The new shaft, called Creighton No. 7, is sunk in one of the oldest operating mines of International Nickel. Geological studies of the Creighton orebody in 1856 foreshadowed its later discovery in 1885; and the first shipment of ore from Creighton to the smelter in Copper Cliff was made 50 years ago in August, 1901.

Designed for ore-hoisting only, the No. 7 shaft is sunk to an initial depth of 2,050 feet. It is 8½ feet by 24 feet in cross section and is concrete-lined throughout.

Serving No. 7 shaft is a 14-foot by 110-inch parallel double-run geared hoist. The skips have a capacity of 15 tons each, and the hoisting capacity is 700 tons per hour.

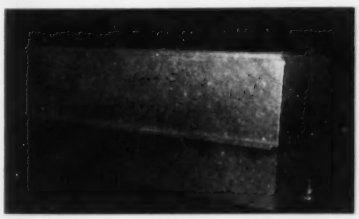
The new 10,000-ton concentrator at Creighton is a compact plant with many unusual features of design and operation. It is built at the site of No. 7 shaft; the headframe and hoist house are integral parts of the mill building, and ore from the mine is hoisted directly into the crushing plant. Part of the mill feed is non-magnetic ore brought by conveyor from another Creighton shaft two-thirds of a mile distant. The crushing plant has a simple straight-line flow sheet with no circulating loads.

Plant's water supply is obtained through a 6-mile pipeline from the Vermilion river, and the product, a bulk concentrate, is pumped through another line 7½ miles to Inco's reduction plants at Copper Cliff. Sand removed from the flotation tailing is returned to be used as backfill

find PLATECOILS more profitable to use

It is less costly to buy and install Platecoils than it is to fabricate pipe coils in their own plant according to Robert Dill, Plant Superintendent of the Newcomb-Detroit Company, Grand Rapids Division. In building the hot rinse tank pictured above they have realized many advantages resulting from the use of Platecoils both for themselves and their customer, Kalamazoo Stove and Furnace Co.

Starting with the original estimate, sales engineers find it much easier to determine the coil size from the convenient Platecoil chart. And Platecoils can be depended upon to deliver the amount of heat specified in their B.T.U. rating. In the construction of the tank, Platecoils are easier to handle and fabrication time and labor are reduced. A Platecoil with the equivalent B.T.U. capacity as pipecoil takes only half the space in the tank thus leaving greater working area. This is important also to Kalamazoo Stove and Furnace Co. as the user.

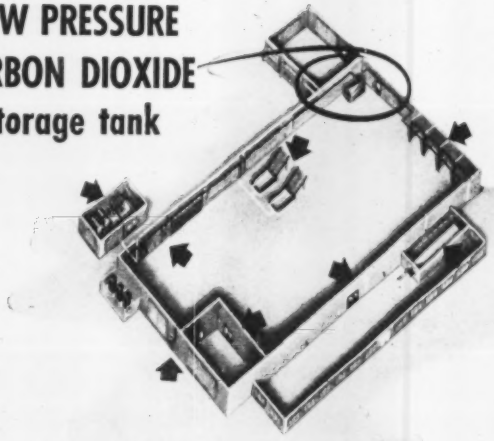


The extra tank capacity comes in handy in the use of the tank as part of an acid etching system used for pickling aluminum prior to spot welding on aircraft parts. And the higher B.T.U. capacity of the Platecoils provides faster heating and quicker starts.

Wherever pipecoils are used, Platecoils will heat faster, can be installed quicker, and will cost less to use. Write today for your copy of Bulletin No. P-72.

Plant-Wide Fire Protection

from a single LOW PRESSURE CARBON DIOXIDE storage tank



Now, your larger size fire hazards can be protected more efficiently at less cost, thanks to C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing Systems. Simple piping, running from one centrally located storage tank, instantly transports clean, non-damaging, non-conducting carbon dioxide anywhere in the plant area . . . to flammable liquids, electrical equipment, storage spaces, manufacturing processes and record vaults. Fire at any protected location is extinguished in seconds with an absolute minimum of expense and interruption.

Flexibility is the keynote of these new type C-O-TWO Fire Extinguishing Systems . . . the low pressure carbon dioxide storage tanks range in capacities from one to fifty tons . . . discharge facilities can either be manual mechanical, manual electric, automatic mechanical, automatic electric or a combination of these . . . especially installed to fit your particular needs. Future plant expansion is easily and economically provided for by initially installing an oversized low pressure carbon dioxide storage tank and adding the supplementary discharge facilities at a later date.

C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing Systems are built with the same superior design and high quality workmanship that have characterized C-O-TWO High Pressure Carbon Dioxide Type Fire Extinguishing Systems for many years. Whether it's fire detecting or fire extinguishing . . . portables or built-in systems . . . C-O-TWO means experienced engineering that assures you of the best type equipment for the particular fire hazard concerned.

So, with current expensive delayed replacements, why not let an expert C-O-TWO Fire Protection Engineer help you now in planning fully approved fire protection facilities for your various properties. Complete free information and descriptive literature is yours for the asking. Get the facts today!

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CALENDAR OF MEETINGS

October 8-13, Concrete Reinforcing Steel Institute: Fall meeting, Grove Park Inn, Asheville, N. C. Institute address: 38 S. Dearborn St., Chicago 3. Managing director: H. C. Delzell.

October 9-12, The Electrochemical Society Inc.: Centennial—Fall convention, Hotel Statler, Detroit. Society address: 325 W. 102nd St., New York 25. Secretary: Henry B. Linford.

October 10-12, Porcelain Enamel Institute Inc.: Shop practices forum, Deshler-Wallick Hotel, Columbus, O. Institute address: 1010 Vermont Ave. NW, Washington. Secretary: Edward Mackaser.

October 11, American Iron & Steel Institute: Regional technical meeting, Hotel Warwick, Philadelphia. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

October 11-12, Society for Advancement of Management: Chicago Industrial Engineering Conference, Naval Armory, Chicago. Society address: 53 W. Jackson Blvd., Chicago 4. Chairman: Theodore W. Franks.

October 11-12, American Institute of Mining and Metallurgical Engineers & American Society of Mechanical Engineers: Annual fuels conference, Roanoke Hotel, Roanoke, Va. Institute and Society address: 29 W. 39th St., New York 18. Institute secretary: Edward H. Robie; Society secretary: C. E. Davies.

October 12-14, Metal Treating Institute: Annual meeting, Detroit. Institute address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herington.

October 13-14, American Society for Metals: Annual seminar, Hotel Statler, Detroit. Society address: 7301 Euclid Ave., Cleveland. Secretary: W. H. Eisenman.

October 13-17, Packing Machinery Manufacturers Institute: Fall meeting, Mid Pines Club, Southern Pines, N. C. Institute address: 342 Madison Ave., New York 17. Secretary: Helen L. Stratton.

October 14-18, American Hardware Manufacturers Association: Fall meeting, Marlborough-Blenheim Hotel, Atlantic City, N. J. Association address: 342 Madison Ave., New York 17. Secretary: Arthur L. Faubel.

October 15-17, American Gas Association: Annual meeting, Kiel Auditorium, St. Louis. Association address: 420 Lexington Ave., New York 18. Secretary: Kurwin R. Boyes.

October 15-18, American Welding Society: Annual meeting, Book-Cadillac Hotel, Detroit. Society address: 33 W. 39th St., New York 18. Secretary: J. G. Magrath.

October 15-18, Society for Non-Destructive Testing Inc.: Annual meeting, Hotel Detroiter, Detroit. Society address: Box 710, Evanston, Ill. President: W. E. Thomas.

October 15-19, American Society for Metals: National Metal Congress & Exposition, Statler Hotel, Detroit, and Michigan State Fairgrounds. Society address: 7301 Euclid Ave., Cleveland. Secretary: W. H. Eisenman.

October 15-19, The World Metallurgical Congress: Hotel Statler, Detroit. Sponsored by American Society for Metals. Manager: W. H. Eisenman; director: Dr. Zay Jeffries.

October 15-19, National Association of Manufacturers: Annual institute on industrial relations, Lake Placid Club, Essex County, New York. Association address: 14 W. 49th St., New York 20. Institute director: Sibyl S. Patterson.

October 16-19, Scientific Apparatus Makers Association: Record controller & midyear meeting, Seaview Country Club, Absecon, N. J. Association address: 20 N. Wacker Drive, Chicago 6. President: Kenneth Anderson.

October 17-18, Steel Shipping Container Institute Inc.: Fall meeting, Pierre & Hampshire House, New York. Institute address: 570 Lexington Ave., New York 22. Secretary: L. B. Miller.

October 18-20, Anti-Friction Bearing Manufacturers Association: Fall meeting, The

(Continued on p. 237)

(Continued from p. 236)

Homestead, Hot Springs, Va. Association address: 60 E. 42nd St., New York 17. Secretary-manager: H. O. Smith.

October 18-20, National Association of Corrosion Engineers: Annual meeting, south-central region, Corpus Christi, Tex. Association address: 919 Milam Bldg., Houston 2. Executive secretary: A. B. Campbell; meeting chairman: George A. Mills.

October 19-20, American Society of Tool Engineers: Semi-annual directors' meeting & south-central regional meeting, Vendome Hotel, Evansville, Ind. Society address: 10700 Puritan Ave., Detroit 21. Executive secretary: Harry E. Conrad.

October 22-24, American Mining Congress: 1951 metal and nonmetallic mineral mining convention, Biltmore Hotel, Los Angeles. Congress address: Ring Bldg., Washington 6. Secretary: Julian D. Conover.

October 22-24, American Standards Association: Annual meeting & national standardization conference, Waldorf-Astoria Hotel, New York. Association address: 70 E. 45th St., New York. Secretary: G. F. Hussey Jr., Adm., USN, Ret.

October 22-24, Packaging Institute: Fall meeting, Commodore Hotel, New York. Institute address: 342 Madison Ave., New York 17. Secretary: Laurence V. Burton.

October 22-25, American Institute of Steel Construction Inc.: Fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 101 Park Ave., New York 17. Executive vice president: L. Abbott Post.

October 22-25, The Wire Association: Annual convention, La Salle Hotel, Chicago. Association address: 300 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

October 22-26, American Association of Electrical Engineers: General fall meeting, Hotel Cleveland, Cleveland. Association address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

October 25-26, Gray Iron Founders Society Inc.: Fall meeting, Edgewater Beach Hotel, Chicago. Society address: 210 National City—E. 6th St. Bldg., Cleveland. Executive vice president: Donald H. Workman.

October 26-27, American Institute of Mining and Metallurgical Engineers, National Open Hearth Steel Committee: Annual meeting, Southern Ohio section, Deshler Wallick Hotel, Columbus, O. Institute address: 29 W. 39th St., New York 18. Section chairman: V. W. Jones, Armco Steel Corp., Middletown, O.

October 28-30, Conveyor Equipment Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: 1129 Vermont Ave., Washington 5. Executive vice president: R. C. Sollenberger.

October 29-31, American Gear Manufacturers Association: Semi-annual meeting, Edgewater Beach Hotel, Chicago. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

October 29-31, National Lubricating Grease Institute: Fall meeting, Edgewater Beach Hotel, Chicago. Institute address: 4638 Nichols Parkway, Kansas City 2, Mo. Executive secretary: Harry F. Bennetts.

October 31-November 2, Foundry Equipment Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: Engineers Bldg., Cleveland 14. Executive director: Arthur J. Tuscany.

October 31-November 2, Porcelain Enamel Institute Inc.: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 1010 Vermont Ave. N.W., Washington 5. Secretary: Edward Mackaser.

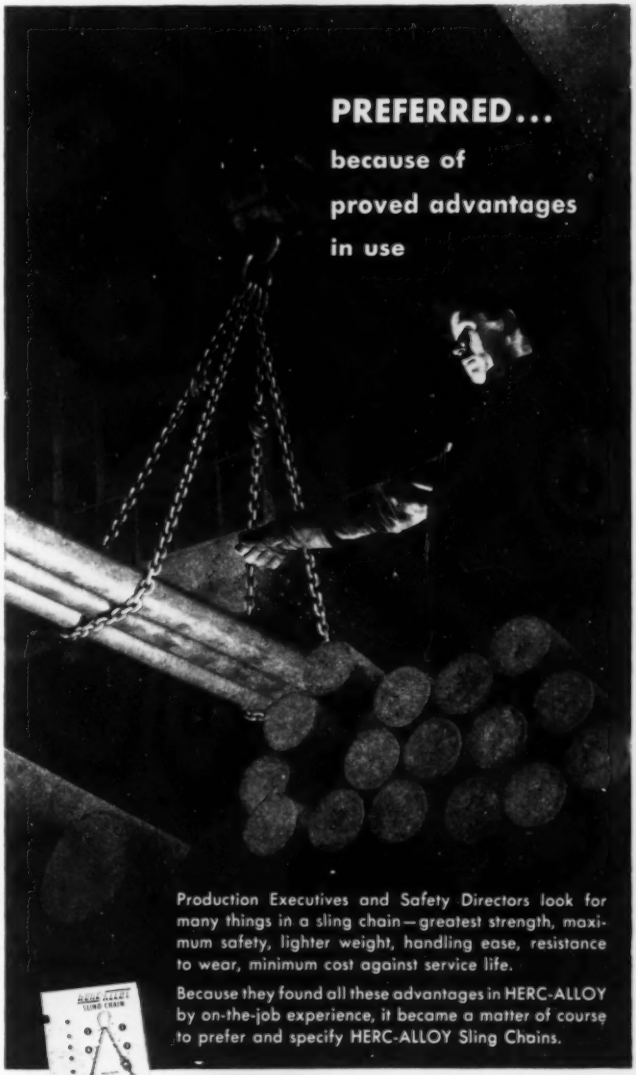
NOVEMBER

November 1-2, Industrial Management Society: Annual time-motion study and management clinic, Sheraton Hotel, Chicago. Society address: 35 E. Wacker Drive, Chicago 1.

November 1-4, National Tool & Die Manufacturers Association: Annual convention, Statler Hotel, St. Louis. Association address: 906 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

HERC-ALLOY

SLING CHAINS



Production Executives and Safety Directors look for many things in a sling chain—greatest strength, maximum safety, lighter weight, handling ease, resistance to wear, minimum cost against service life.

Because they found all these advantages in HERC-ALLOY by on-the-job experience, it became a matter of course to prefer and specify HERC-ALLOY Sling Chains.

Write for illustrated Data Book No. 3 which contains helpful information on sling chain selection and use.

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Typewriter mainspring redesigned

for volume production at lowest possible cost

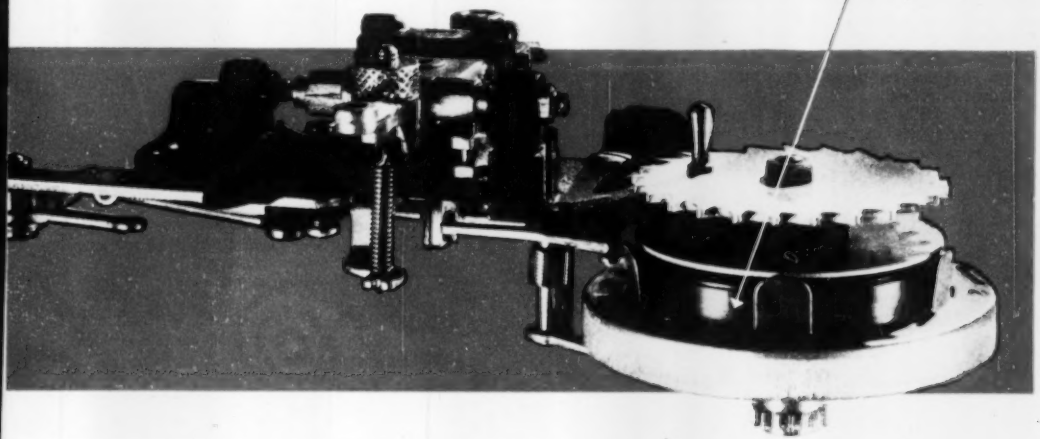
The American Quality Spring shown here is the absolute heart of a famous-make typewriter. It furnishes driving power for the entire typewriter—operates the drawbar, controls spacing between characters, drives the ribbon mechanism.

The spring is wound and unwound thousands of times every week, yet tension remains constant and breakage is almost unheard of.

To perfect the mechanical properties of the spring, our engineers worked hand in hand with the manufacturer's engineers. The design was altered to eliminate a weak spot that was responsible for breakage. This change was combined with others that made the spring easier to produce in quantity—at a lower cost.

There's only one way to get such improved spring performance at an even lower cost: let us work with you in the early stages of design. Our designers are real experts on the mechanics and metallurgy of spring design. We know just what our modern spring-making machinery will do—and therefore we can help you design a better spring that is easier to mass-produce, cheaper to buy.

This is the mainspring drum bracket group on the typewriter mentioned above. The American Quality Spring is in position, ready for years of trouble-free service.



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SOAKING PIT CRANE

with MULTI-PURPOSE tongs

Here's a rugged, lighter weight Soaking Pit Crane that handles any width slab or ingot. It'll make bottom . . . afford the same visibility as the high rack type Soaking Pit Crane, yet takes up no more head room than a low type Soaking Pit Crane.

Special features include: telescopic ram, all operating mechanism located on deck of trolley, operator's cage on deck of trolley provides best visibility and greatest distance from all sources of heat.

Multi-Purpose Tongs provide gripping range of 6" minimum to 66" maximum opening. Consequently, a much greater range of ingot and slab sizes can be readily handled.

The Multiple Range Tongs can be installed on any model or make of Soaking Pit Crane by Alliance Engineers who will be happy to discuss your specific requirements or give you general information of interest to your industry.

- MAXIMUM RANGE CAPABILITIES
- CRANE REQUIRES MINIMUM SPACE
- AFFORDS MAXIMUM VISIBILITY
- ALL MECHANISM EASILY ACCESSIBLE
- KEEPS OPERATOR AWAY FROM HEAT

THE ALLIANCE MACHINE COMPANY

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New Products and Equipment

Stud Welds at Production Rates

High-speed dual head stud production unit developed by KSM Products Inc., Merchantville, N. J., is suitable for military and civilian application. Unit combines precise fast operation and heavy-duty construction features. In operation, accurate placing of work

in V holder is insured by built-in microswitch which prevents operation if work is not correctly located. After loading suspension button and arc shield into each of the two welding heads and placing work in V holder, operator presses the two start buttons at front of unit. The unit then automatically completes the operation.

Special features of the production unit include: Automatic clamping device to prevent movement of work; leader pin guides to insure accurate positioning of the work in relation to welding heads; and automatic spark shield which raises up in front of welding heads prior to welding to protect operator from possible flash or splatter. Capacity of the unit is eight welds per minute.

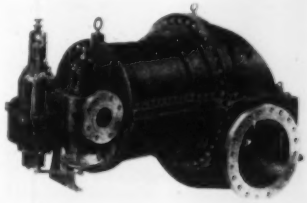
Multiple Hole Piercing

Hydraulic machines for the simultaneous piercing of all holes and the trimming of automotive frame members, production riveting assembly operations on automotive frame and producing accurately pierced holes and related assembly operations for jet engine components are being manufactured by Danly Machine Specialties Inc., 2100 S. Laramie Ave., Chicago 50, Ill. These machines were originally patented by Mueller Engineering Co., Dearborn, Mich.

Special features contained in the hydraulic cylinder, basic unit of the machine, enable it to be used on a wide variety of jobs. Built-in blank-holding and stripping action, which is entirely automatic and requires no springs, is actuated hydraulically after the power stroke. Rigid construction permits punching holes under difficult conditions, such as when the steel is thicker than hole diameter. Principal features of the hydraulic system include continuous pressure intensification which permits flexibility in adding cylinders in the circuit of the power unit. A patented transfer valve permits handling extremely high pressures while eliminating hydraulic shock in the circuits.

Turbines Rated at 200-5000 hp

Multi-stage, mechanical drive turbines made by General Electric Co., Schenectady 5, N. Y., are available in a line with ratings from 200 to 5000 hp and in four types: DP, DR, DRV and DRVX. Type DP, rated from 200 to 3000 hp, is designed for driving pumps, compressors, fans,

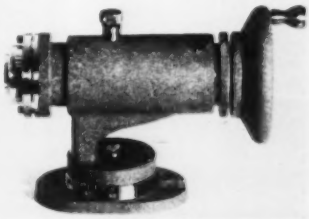


blowers and similar equipment. Its hydraulic governor provides a 30 per cent speed range and 6 per cent speed regulation. Type DR, rated from 200 to 5000 hp, has wider speed range, greater capacity and accuracy of control. An oil-relayed governor makes possible a speed range up to 6 to 1, with 4 per cent regulation and ½ per cent steady state speed variation.

Type DRV, also rated at 200 to 5000 hp, has similar governing characteristics but utilizes automatic sectional valves linked to the oil relay governor to minimize throttling losses under fluctuating load factors. Last of the units, type DRVX, is used where process steam is desired at a definite, steady pressure.

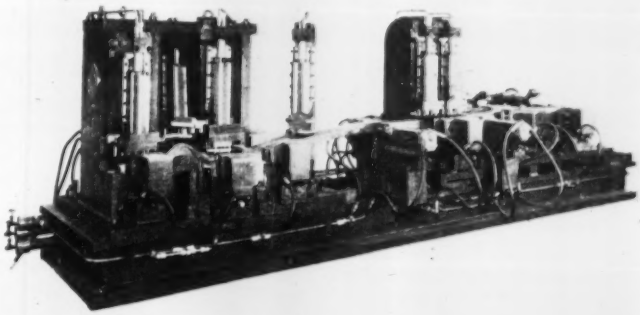
Relief Fixture Speeds Grinding

Relief grinder that speeds all types of cutter grinding operations is announced by Western Aero Industries, 3305 Burton Ave., Burbank, Calif. The fixture handles countersinks of all



types, center drills, integral pilot cutters and right or left hand pilot drills. It is designed to operate at maximum efficiency by unskilled help. Two wrenches are needed to adjust for correct relief and angle in relation to the grinding wheel.

Relief unit fits any standard grinder, handling work from $\frac{1}{16}$ to 1 inch in diameter with standard collets. Lift of the single cam is variable from 0.001 to $\frac{1}{8}$-inch and adjustment pins are provided for 1, 2, 3, 4 and 6-fluted cutter grinding. Housing is made of cast iron and supports a



hardened and ground spindle on two large bearing surfaces. Cam is hardened tool steel with steel adjustment pins. Fixture swings 90 degrees to the right or left; base is calibrated in 5-degree increments.

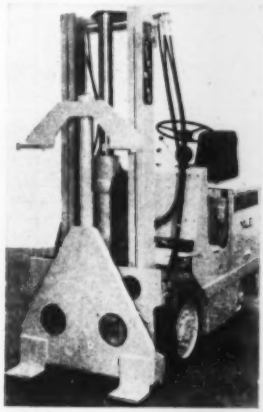
Motor Has Direct Mounting

Hydraulic pump motor, developed by Reuland Electric Co., Alhambra, Calif., features a system of direct endbell mounting between pump and motor. This system is standardized and is adaptable to all makes of pumps. Primary benefit of mounting technique is assurance of precision alignment in every installation. All motors are supplied with machined endbell flanges, pre-engineered to fit the registers on pump mounting flange.

Reduction in overall installation costs is effected by bolting the two flanges together, thus eliminating separate mounting and alignment of each unit as well as fabrication of special mounting platforms for raising the impeller shaft to drive shaft height. Motors are supplied with pump flange mount on one or both endbells in all standard ratings of horsepower and speed.

Clamp Truck Tiers Crates, Boxes

Automatic clamp attachment for industrial lift trucks that tier crated and boxed products without use of pallets is offered by Philadelphia Division, Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa. The clamp is hydraulically operated, handling two objects up to 75 inches high and 36 inches wide each, stacking them as high as 17 feet simultaneously. The device is available for any capacity Yale gasoline or electric truck.



A space saver, truck is equipped with hydraulic side shifter that permits load and clamp to be shifted 4 inches to either side of the center. This enables close, accurate spotting of the load to save space next to wall. Short length of forks indicates an advantage in loading of freight cars, where again the side shifter permits use of space near walls.

Upright Precision Drills

Cosa Corp., 405 Lexington Ave., New York 17, N. Y., is introducing the Alzmetall line of high-powered upright precision drills in the United States. Machines are made in three sizes, in which infinitely variable speed drives range from 105-1450, 90-900 and 40-800 rpm, respectively. Range of drilling capacities for cast iron is 15/16 to 2-5/16 inches; for steel, 13/16 to 2 inches. Smallest machine has a No. 3 Morse taper spindle, the two larger types have spindles with No. 4 Morse tapers. All three machines have a light mounted on the underside of the head.

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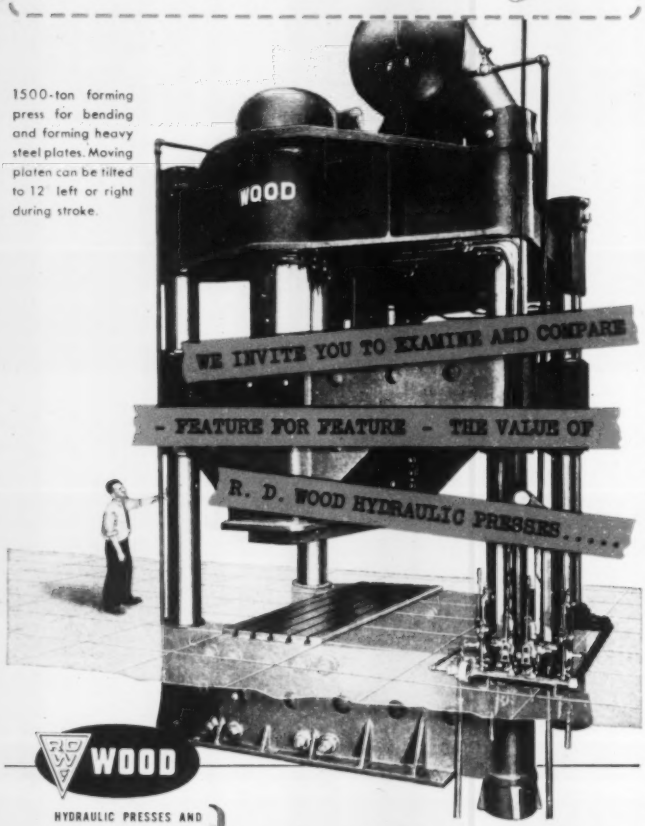
1500-ton forming press for bending and forming heavy steel plates. Moving platen can be tilted to 12° left or right during stroke.



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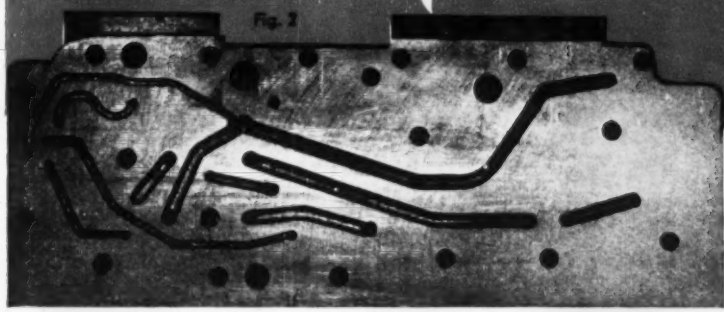

Fig. 1—A Modern Tool Works Limited "Drillmatic".

Fig. 2—The Meehanite hydraulic manifold—the "heart" of the operating and control mechanism.

SPECIFIED MEEHANITE CASTINGS

Take *YOUR* Casting Problem To A MEEHANITE FOUNDRY

American Brake Shoe Co.	Mahwah, New Jersey
The American Laundry Machinery Co.	Rochester, New York
Atlas Foundry Co.	Detroit, Michigan
Banner Iron Works	St. Louis, Missouri
Barnett Foundry & Machine Co.	Irvington, New Jersey
E. W. Bliss Co.	Hastings, Mich. and Canton, O.
Builders Iron Foundry	Providence, Rhode Island
Continental Gin Co.	Birmingham, Alabama
Crawford & Doherty Foundry Co.	Portland, Oregon
The Cooper-Bessemer Corp.	Mt. Vernon, Ohio and Grove City, Pa.
Empire Pattern & Foundry Co.	Tulsa, Oklahoma
Farrel-Birmingham Co., Inc.	Ansonia, Connecticut
Florence Pipe Foundry & Machine Co.	Florence, New Jersey
Fulton Foundry & Machine Co., Inc.	Cleveland, Ohio
General Foundry & Manufacturing Co.	Flint, Michigan
Greenlee Foundry Co.	Chicago, Illinois
The Hamilton Foundry & Machine Co.	Hamilton, Ohio
Hardinge Company, Inc.	New York, New York
Hardinge Manufacturing Co.	York, Pennsylvania
Johnstone Foundries, Inc.	Grove City, Pennsylvania
Kanawha Manufacturing Co.	Charleston, West Virginia
Lincoln Foundry Corp.	Los Angeles, California
E. Long Ltd.	Orillia, Ontario
Otis Elevator Co., Ltd.	Hamilton, Ontario
The Henry Perkins Co.	Bridgewater, Massachusetts
Pohlman Foundry Co., Inc.	Buffalo, New York
Rosedale Foundry & Machine Co.	Pittsburgh, Pennsylvania
Ross-Meehan Foundries	Chattanooga, Tennessee
Shenango-Penn Mold Co.	Dover, Ohio
Standard Foundry Co.	Worcester, Massachusetts
The Stearns-Roger Manufacturing Co.	Denver, Colorado
Traylor Engineering & Mfg. Co.	Allentown, Pennsylvania
Valley Iron Works, Inc.	St. Paul, Minnesota
Vulcan Foundry Co.	Oakland, California
Warren Foundry & Pipe Corporation	Phillipsburg, New Jersey

"This advertisement sponsored by foundries listed above."

The hydraulic operating mechanism of this "Drillmatic" drilling machine (Fig. 1) manufactured by Modern Tool Works Limited, Toronto, is of course the functional heart of the machine. Successful performance of such a mechanism is definitely dependent upon the hydraulic manifold (Fig. 2). In this and other types of drilling equipment the manufacturer specifies Meehanite castings for this part because of the design requirements for absolute density and high strength. The manifold is used for gasket mounting of various hydraulic control valves and the castings must withstand 1000 psi during operation.

In addition to this particular component the press shown is built with the following Meehanite castings:

1. **Table**
2. **Table Base**
3. **Fixtures**
4. **Retracting Bush Plates**
5. **Multiple Spindle Drill Head**
6. **Head Adapter**
7. **Motor Support Bracket**
8. **Hydraulic Unit and Base**

In the hydraulic unit the main body and cylinder are cast integrally and in Meehanite metal assure the required resistance to wear, pressure and high strength characteristics.

This equipment is another example of superior design in precision production tools made possible through the dependable and uniform *Quality* characteristics of Meehanite castings.

Write for our new booklet "25 Years of Proof in Service."

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MEEHANITE

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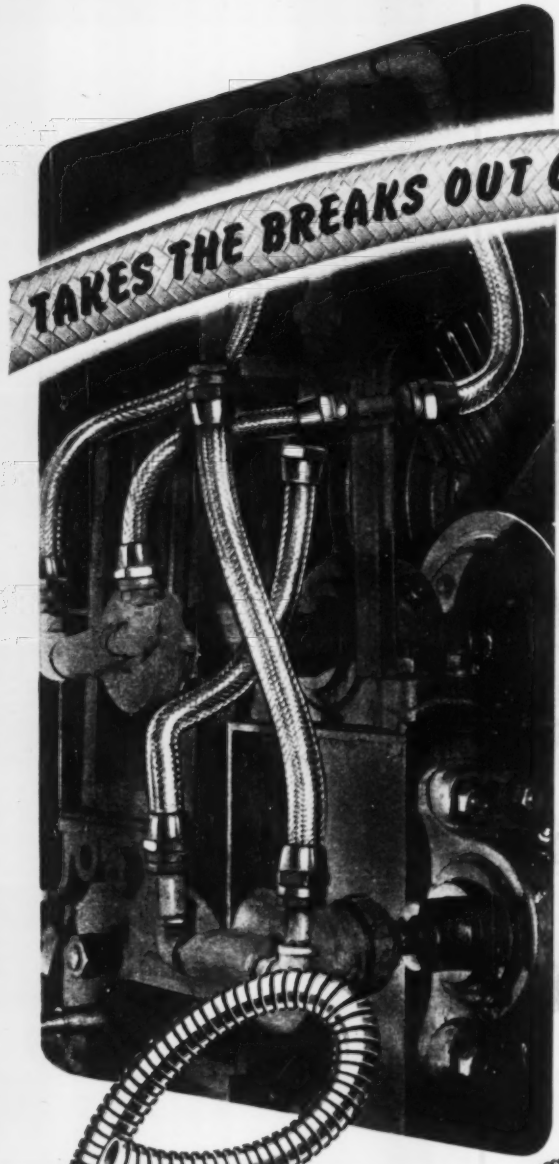

PENFLEX FLEXIBLE TUBING CURES BREAKS IN VIBRATING STEAM LINES

One hundred pounds of steam fed to the spinning rollers of a paper laminating machine that was constantly moving a quarter of an inch. Rigid piping crystallized under the high frequency movement, broke and caused shutdowns. Then two years ago this large mid-west paper manufacturer called in Penflex.

The answer was one-half inch and three-quarter inch diameter braided Penflex-weld, equipped with Metseal couplings. This corrugated, all metal welded tubing serves the double purpose of giving flexibility and developing super-resistance against bursting, crushing or breaking. Non-burnable Penflexweld affords complete protection against high temperatures. Vibrating motion is isolated at its source.

Penflex engineers can help you solve flexible tubing application problems. In addition to corrugated welded tubing Penflex manufactures a complete line of four-wall, interlocked tubing from 1/8" I.D. and up . . . automatic barrel fillers, accessories and fittings. Write for the new Penflex catalog that gives the latest data on the application of flexible tubing for the greatest efficiency.

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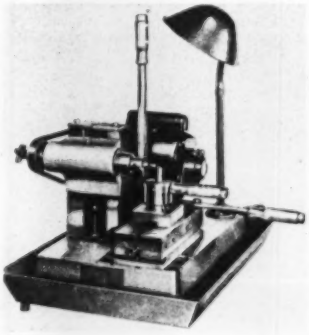
Penflex

HEART OF INDUSTRY'S LIFE LINES

The larger drills have adjustable automatic depth releases and can be equipped with coolant and tapping attachments.

Machine Turns, Mills, Grinds

Combination bench-type production machine that turns, mills or grinds is introduced by Viking Industries, 220 Montague St., Rockford, Ill. It features a common base, power unit, spindle and vertical and horizontal slides to which special tooling and fixtures are added for the desired type of operation. A complete set of tooling is available for its conversion,



or machines are furnished as single-purpose units. Coolant system is optional.

Spindle speeds with standard pulleys are 825 and 3450 rpm. An additional range of speeds from 100 to 7000 rpm is optional. One-inch spindle with No. 7 taper hole is mounted in heavy ball bearings; through hole is ⅜-inch in diameter. Spindle is adjustable vertically with maximum 7-inch distance from centerline to work table surface. Overall bench space required is 11 x 18 inches, while table working surface of 6 x 9½ inches is provided.

Radial Drilling Machine

Radial drilling machine with 9-inch column made by Midgley & Sutcliffe of Leeds, England, is offered by British Industries Corp., 164 Duane St., New York 13, N. Y. The 9-inch column, extremely rigid and comprised of a single unit, is accurately machined and ground to receive the arm and roller bearings for the rotating motion. Saddle is mounted on needle roller bearings and moves freely by finger pressure.

Constant speed 2 hp reversing motor, flange-mounted directly on top of saddle, provides drive. There are

OH, BALONEY! YOU'RE LIVIN' IN THE OLD HORSE AN' BUGGY DAYS! A MOSSBACK OF THE OLD MUSTY MAUVE DECADE!
YEAH? WELL, IT'S THE OL' BOYS OF TH' MUSTY MAUVE THAT MADE IT POSSIBLE FER YOU TO HAVE WHUT LITTLE BRAINS YOU GOT! WHO INVENTED ALL TH' MODERN CONVENIENCES--SOME JITTERBUG LIKE YOU? HAH!
HE'S RIGHT--YOU HAD TO RIDE IN AN OXCART TO WANT SOMETHIN' BETTER ...THIS GENERATION IS GETTIN' TOO COMFORTABLE, I THINK!
THERE'S ONE IMPROVEMENT THEY AGREE ON, THOUGH--SOL-SPEEDI-DRI! TH' BOY IS SORE BECAUSE IT WAS OLD JOE WHO FIRST THOUGHT T'SEND FOR A SAMPLE!
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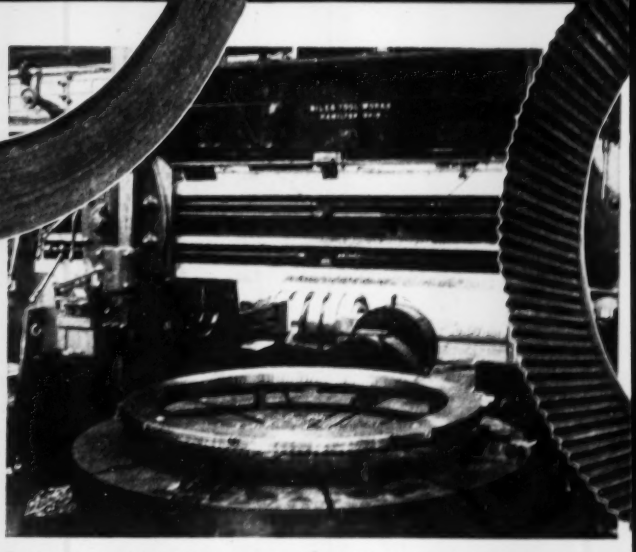
THE STANDARD GIVES

NOTICE: DESIGN AND PURCHASING DEPARTMENTS

Standard's three-unit mills—each composed of a horizontal mill and two steam hammers for preliminary operations—can roll practically all sizes of rings up to a maximum of 12-feet outside diameter. Let us quote on your requirements.

Standard Weldless Ring Blank, rolled to close tolerances for conversion to a table rack spiral bevel ring gear for a boring mill.



Finish-machining the ring gear on a Niles vertical boring mill. Teeth have already been cut.

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STEEL WORKS ROLLED GEAR BLANK

THIS RING GEAR

a better start in life

The finished ring gear. Uniform metal structure assures high precision in gear tooth form and dimension.

The job of the table-rack spiral bevel ring gear on a modern boring mill is rough, rugged and responsible—and the only way to get the essential physical properties *in the gear* is to have them *in the blank*. Strength—to take the stress and strain of high-speed production with deep-cutting carbide tools. Uniform structure—to permit the precision machining that is the basis of precision operation. Accuracy in dimension—to save machining time and waste.

Standard Steel Works blanks meet every requirement. Starting with steel produced in Standard's own open-hearth furnaces, the rings are rolled to close tolerances to develop every desirable property inherent in the metal . . . heat treated to further improve service characteristics. If you have a ring-gear problem, Standard blanks may provide the solution you are looking for. You'll find Standard an ideal supplier—big enough to handle the most demanding jobs . . . small enough to make every job a matter of direct personal concern.

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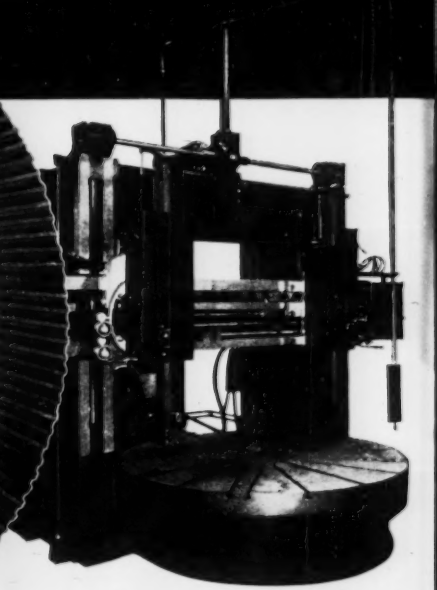
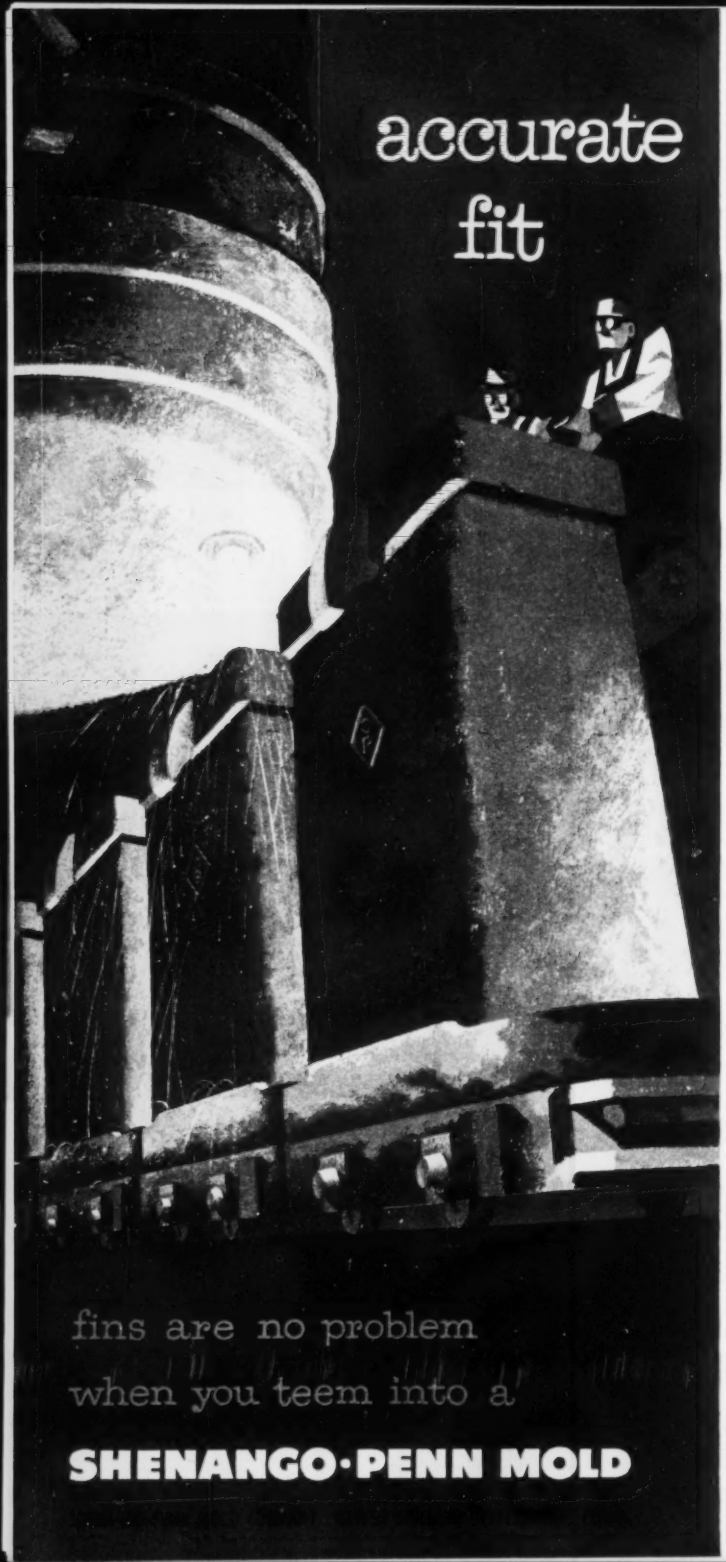


Niles 10-foot hydraulic feed vertical boring mill; table is driven by the gear shown. This is a high-production machine, for use with carbide tools—which calls for high strength in the drive gear.

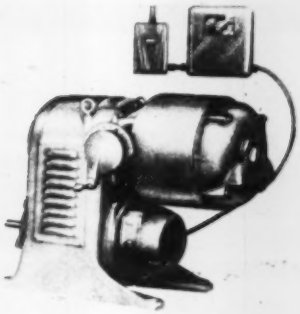
-LIMA-HAMILTON



nine rates of spindle speeds obtainable through two conveniently positioned levers. Automatic depth trip for knocking off any predetermined depth of hole is fitted. Table can be supplied in either rigid or swivel types.

Motors Have Controlled Braking

Fast, controlled braking of its Veridrive motors is a development of U. S. Electrical Motors Inc., 200 East Slauson Ave., Los Angeles 54, Calif. Brake is mounted directly on the variable speed shaft to eliminate transmission of braking action through the belt. Ideal for inching or jogging,



it offers shockless operation, producing a constantly increasing torque during stopping. Unlike the solenoid brake, its frictional force is controlled directly by the magnetic action.

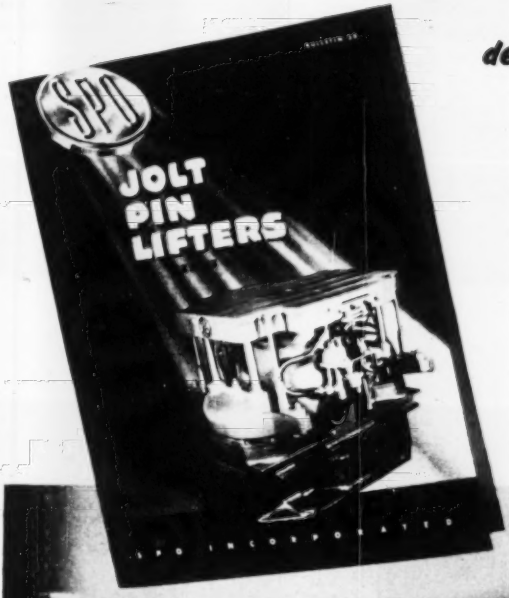
Permanent braking torque is an aid in applications demanding accurate regulation. Adjustment for installations requiring diversified braking torque is made through a knob-controlled rheostat. Brake used is the Warner type ICB, adaptable to both Veridrives and Veridrive-Synchro-gears. It is direct current-actuated with a maximum 25-35 watt power requirement.

Driller Performs 18 Operations

An automatic drilling machine developed by National Automatic Tool Co., Richmond, Ind., performs 18 operations on 180 cylinder blocks per hour. Operations include drilling holes from 0.9375 to 0.0625-inch, diameter, rough boring, facing, chamfering, milling, rough and finish reaming. The machine is station-type, has a 65-inch diameter six position automatic index rotating table and a center column of auxiliary horizontal units.

Seven fixed-center gear-driven heads contain 52 standard drilling

Molding Machines



New Bulletin describes SPO line of Jolt Pin Lifters

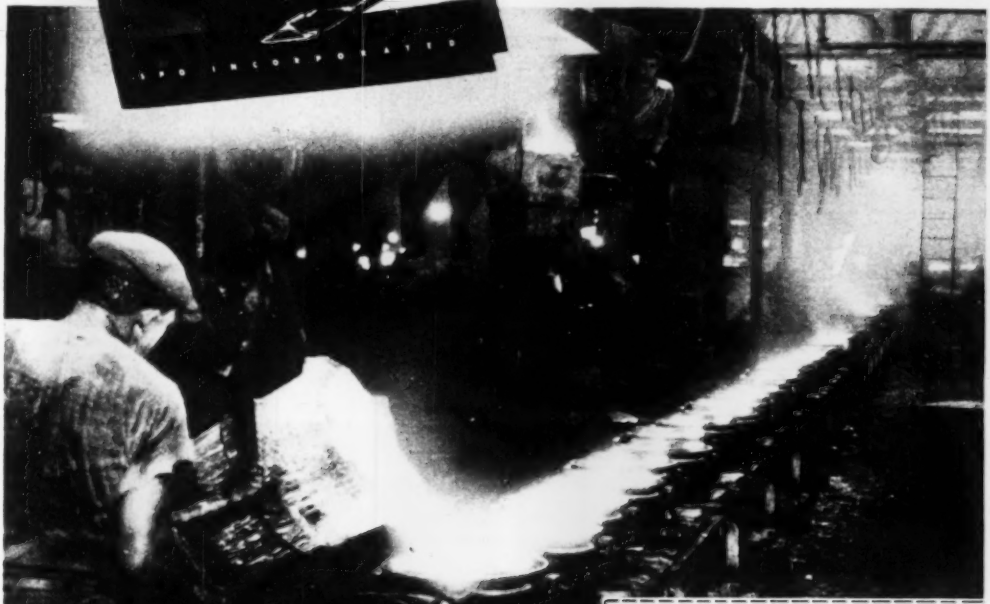
Complete data on the Series 3000 high-production jolt pin lifters are presented in this new illustrated catalog which is available to foundry management and purchasing personnel such as superintendents, foremen, production expediters, etc. Designed for maximum speed, safety and ease of operation, these machines feature the patented SPO "inverted jolt" mechanism.

The jolt pin lifters described in this publication have jolt capacities ranging from 750 to 4000 pounds and are fully adjustable to meet diversified production demands. Pivot type adjustable lifting pins will accommodate any type or size of flask within their capacities. Both breakaway and secondary draw speeds can be adjusted to different job requirements, and jolt impact intensity of each machine is variable.

In this catalog, dimensions, capacities, pattern draw, SPO vibrator size and other pertinent data are tabulated for quick reference. Photographs and line drawings depict the construction and features of the various machines.

Bulletin No. 30 will be sent upon receipt of coupon or letterhead request.

129-S1



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spindles mounted in antifriction bearings and provided with nose adjustment wherever centers will permit. Special milling head contains two milling spindles. A six position fixture is arranged to accommodate two cylinder blocks in each of the positions.

Simplicity, Accuracy Mark Gage

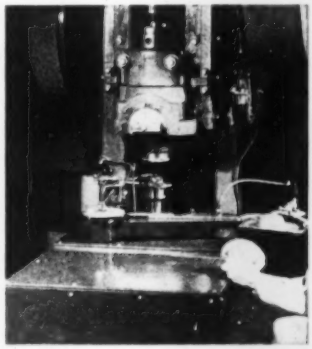
Measurements to tolerances as fine as 0.00005-inch anywhere in a 3-inch length are obtainable on a universal depth gage introduced by Saart, Kraemer and Hanscom Inc., 1 Washington Ave., Providence 5, R. I. Indicated tolerance may be taken in measurement of depth, length, angles or steps. Size of the reference plate is 3¼ x 4 inches, weight is approximately 7 pounds. Reference plate and edges are finish ground and electrolized for wear and corrosion resistance. Alloy has a 79-81 Rockwell C hardness value. Company designation is model DP-56-R 1.

Press Feeding, Sans Operator

Punch press loader that removes the operator from his press feed job and increases press speeds on redraw operation by 10 to 60 per cent over hand feeding, is offered by Magnaflux Corp., 5900 Northwest Highway, Chicago 31, Ill.

Feeder has mechanical fingers that pick up parts after first draw, and feed one or more consecutive redraw presses at speeds up to 1200 parts per hour. Similar fingers remove the parts from the press to feed them on another conveyor to further press operations. Complete operation cycle is regulated by the feeder's speed adjustment.

At the proper point after loading, press is tripped by the feeder, with



either electric or air triggering. If the part is not removed from the die, a safety circuit stops both feeder and press. If parts are not being loaded to the die, memory circuit will continue to operate the press and feeder, avoiding shutdowns. After any shutdown the circuit starts the machine at the point of interruption. Mechanical fingers are designed for parts to be handled, and are held in chucks for quick change between press runs.

Cold Rolling Chipless Threads

Carl Hirschmann Co., 30 Park Ave., Manhasset, N. Y., U. S. representative for S. A. Thommen, Waldenburg, Switzerland, is offering the Thommen G-45 thread rolling machine for cold rolling chipless threads. Machine is designed to handle 120 to 1500 pieces per hour, depending on kind of metal and size of thread. It cold rolls chipless threads of high precision in standard and special steel including molybdenum, chrome-nickel and stainless and most of the nonferrous metals.

Maximum pressure is 13,230 pounds; thread diameters range from 5/64 to 1-57/64 inch; thread rolling pitch is 0.016 to 5/32 inch; and maximum length to be rolled is set at 2-23/64.

IF YOU NEED ROUND OR FLAT STEEL SPRINGS, parts, assemblies or stampings for defense equipment, Cuyahoga's experience and facilities for applying spring and wire design to defense applications are available to prime and sub-contractors.

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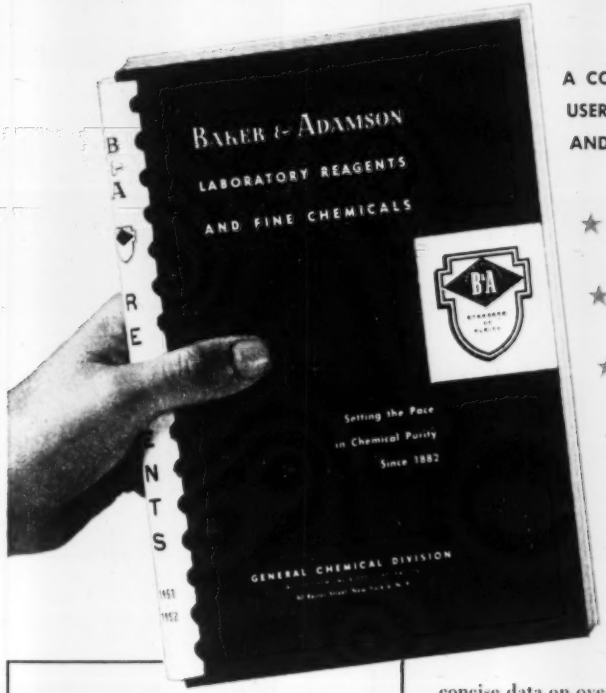
THE BIG NEW 1951-52
B&A CATALOG of Reagents & Fine Chemicals



A COMPLETE BUYERS' GUIDE FOR USERS OF LABORATORY REAGENTS AND FINE CHEMICALS

- ★ For Manufacturing Control Laboratories
- ★ For Production Requiring Quality Chemicals
- ★ For Process Planning and Development
- ★ For Research Laboratories
- ★ For Educational Laboratories

Just off the press—Baker & Adamson's new 1951-52 Catalog is profusely illustrated . . . packed with 264 pages of important information. Gives clear, concise data on over 1,000 B&A Laboratory Reagents and Fine Chemicals! Includes such pertinent facts as grades, strengths, maximum limits of impurities, etc. If you buy or specify laboratory reagents, this new 1951-52 B&A Catalog belongs on your desk. Send for your copy today.

Packed with helpful information

STORAGE AND HANDLING: Special section gives helpful "do's and don'ts" on handling chemicals that require extra precautions.

PACKAGING SECTION: Exclusive new feature—photographs and full details on major B&A packaging, including:...the "PBL" Drum with polyethylene liner, the 9-bottle case for reagent acids, the 6-½ gallon carboy, the "Saftepak" plastic dispenser for HF, and many others.

EXTENSIVE DATA: Over 230 pages of specifications, other pertinent data on B&A Reagents, also on many Fine Chemicals.

Write Today — **Fill out coupon, attach to your business letterhead and mail today. Free to all qualified users and buyers of reagents.**

BAKER & ADAMSON PRODUCTS, General Chemical Division
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Please send me your new 264 page catalog of Baker & Adamson Reagents and Fine Chemicals for 1951-52.

Name_____

Organization_____ Position_____

Address_____

City_____ Zone____ State_____

19-10

Quick-As-Wink
AIR AND HYDRAULIC
Control Valves

No. 1551-N3
¼ Inch Neutral Position 3-Way Air Valve

HAND OPERATED Air Valves

Thousands of Uses Throughout Industry

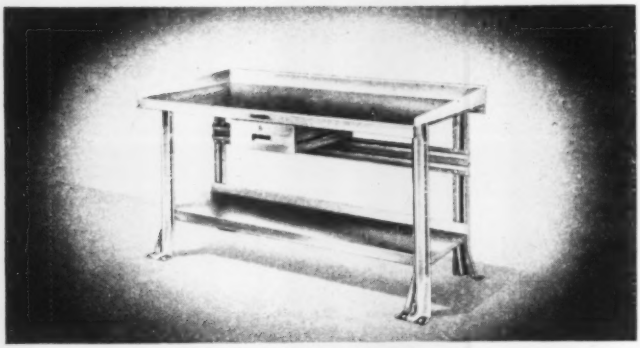
● Universally used and endorsed. Valving mechanism has stainless steel body and push-pull rods, brass sleeves, self-sealing U-packers and many other refinements, all fully enclosed against dirt, assuring long efficient trouble-free operation. No metal to metal seating. ⅜" to 1½" sizes, 3-way and 4-way, neutral position and regular actions. Pipe header mounting plates furnished if desired. *Write for full details.*

THE HIGHER THE PRESSURE THE TIGHTER THE SEAL

Quick-As-Wink
AIR AND HYDRAULIC
Control Valves

Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1928 East Pershing St., Salem, Ohio



THE **HALLOWELL** *WORK BENCH OF STEEL*

Standardized, ready-made HALLOWELL Work Benches save trouble and expense of "building your own"; provide superior equipment for maximum productivity.

Interchangeable units readily adaptable to individual requirement. Easily bolted together to form continuous bench, yet may be taken down and reassembled as single units. Rigid, heavy-duty construction eliminates bolting to the floor, minimizes installation and maintenance.

HALLOWELL Work Benches do credit to any plant. Functional design and attractive appearance encourage better plant housekeeping and worker performance.

Full details in Bulletin 701-1.

SHOP EQUIPMENT **HALLOWELL** OF STEEL

Ready-Made, Standardized

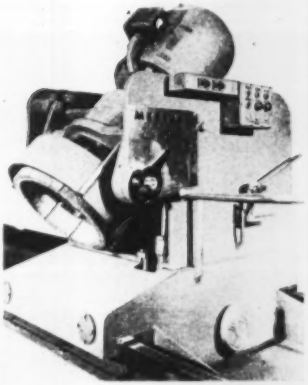
SPS STANDARD PRESSED STEEL CO.

JENKINTOWN 33, PENNSYLVANIA

inches. Maximum hardness is 170,000 psi and the minimum elongation is 12 to 8 per cent.

Grinder Eliminates Traverse Bed

Elimination of traverse bed common to conventional traveling head grinders is a feature of the Mercury series E-20 grinders offered by Mercury Engineering Co p., 2100 N. Farwell Ave., Milwaukee 2, Wis. Designed for grinding armor plates, it offers opportunities in grinding edges, angular surfaces, compounds and bev-



els as well as machining pads on heavy castings 20 feet or longer. The grinder runs along rails on self-powered precision rollers equipped with built-in leveling devices. The series has a 20-inch face-type grinding wheel mounted on a head which tilts from horizontal to full vertical. Two or more grinders can operate simultaneously on a single set of rails.

Twenty hp motor and heavy duty precision spindle assembly are mounted within rigid trunnions and arranged to feed in and out through a 7-inch range. A planetary gear driven motor reducer is used in combination with precision lead screw.

Feeding Rate Equals Load

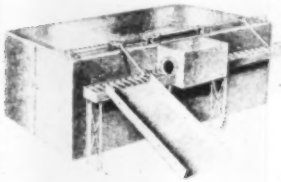
Accurate adjustment of coal-feeding rate to exact load demand is achieved by Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland, O., through use of its infinitely variable transmission on the company's Coal Flow stoker series. Featured on both the CF and PCF series, the variable drive is particularly suited for use with modulated type combustion controls. Maximum accessibility for servicing is achieved by mounting the unit above the conveyor work. This

also reduces possibility of damage resulting from flooded pits and boiler rooms. An automatic overload device and torque indicator of spring scale accuracy are built into the transmission.

Furnace Gives Uniform Heat

Loftus Engineering Corp., 610 Smithfield St., Pittsburgh, Pa., offers a 60 cycle induction furnace for heating nonferrous metals and some applications of steel.

The furnace provides absolute uniformity of heating and at the same time assures balanced electrical loading from three phase line. To accomplish this, the transformer converts balanced three-phase power into two phase operation.



Two closely interlaid coils, leading off the two phase line, surround the billet and provide characteristics of uniformity and thorough penetration of single phase heating. Large eddy currents flow in the billet to be heated, insuring fast, clean and uniform heat for forging extrusion and rolling. Furnace is built to customer's specification, designed for any size or shape of billet.

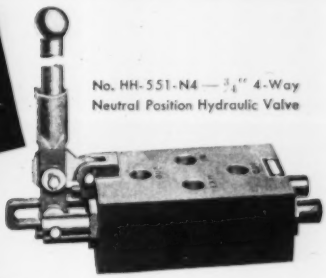
Maintenance, Production Welder

Airco model MCM 200 ampere transformer welder, designed for general maintenance and production welding, is offered by Air Reduction Co., 60 E. 42nd St., New York 17, N. Y. The model has a full 200-amp, 50 per cent duty cycle. Four variations are available: A 220 volt or a 220/440/550 volt unit, each with or without power factor correction. Two open circuit voltages are provided—80 volts on the low range, 55 volts on the high range. This combines easy arc starting with a lower kva demand load and primary ampere current. Absence of moving parts keeps maintenance costs low.

Cam Grinder Improved

Tapers required on some automotive cam contours are produced automatically at normal production efficiency as a result of improvements

Quick-As-Wink AIR AND HYDRAULIC Control Valves



No. HH-551-N4 — ¾" 4-Way Neutral Position Hydraulic Valve

LEVER OPERATED Hydraulic Valve

For water or oil hydraulic systems to 5000 p. s. i.

● Unsurpassed for efficient trouble-free service controlling double acting hydraulic cylinders and other important high pressure hydraulic circuits. Positive, fast acting. All parts are in pressure balance, eliminating any tendency to creep or crawl. Machined steel housing, chrome plated and polished stainless steel plungers. Self sealing U-packers. Metal valving rings take the impingement of the liquid, preventing wear on the packings. ½" to 1½" sizes. Available also in pilot operated designs up to 4". *Write for full details.*

THE HIGHER THE PRESSURE THE TIGHTER THE SEAL

Quick-As-Wink AIR AND HYDRAULIC Control Valves

Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

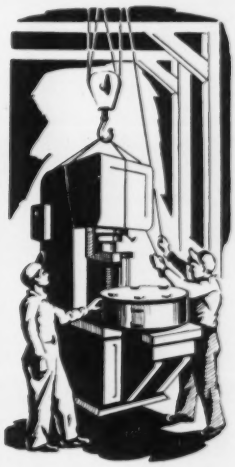
Mfd. by C. B. HUNT & SON, INC., 1922 East Pershing St., Salem, Ohio

When PRODUCTION *hangs by a "Thread"...*

specify the wire rope that gives the greatest service. "HERCULES" (Red-Strand) *Preformed* spools more evenly—bends more smoothly. Handles more safely. Splices more easily. For fewer replacements are needed.

Engineered to reduce internal tension and twisting, "HERCULES" (Red-Strand) *Preformed* stays on the job—*in* the groove.

For uninterrupted production, there is only one right rope . . . be sure to select the correct size and type.



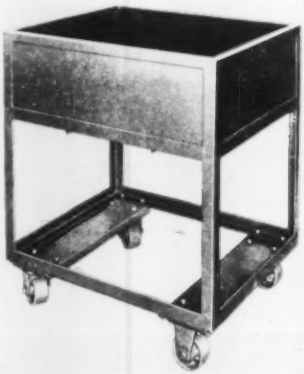
LESCHEN WIRE ROPE

Feel free to consult our Engineering Department at any time for specific recommendations. A. LESCHEN & SONS ROPE CO., 5909 Kennerly Ave., St. Louis, Missouri. Warehouses and branch offices in all principal cities.

made on its No. 2 automatic hydraulic cam grinding machine by Norton Co., Worcester 6, Mass. Tapers in either direction, or in both directions on the same shaft, are speedily produced through these modifications. Provision is made for grinding straight faced cams whether machine is arranged for grinding tapers in one or both directions. Company designation for the machine is Cam-O-Matic.

Shallow Bed Floor Trucks

Shallow bed floor trucks, in a line called the Universal Stock Toter, are offered by Industrial Engineering & Mfg. Co. Inc., Brimfield, Ind. Truck maneuvers easily, is designed for numerous jobs such as line and machine



stocking, moving work parts, or conveying smaller parts in stockroom or shipping department. It places work at normal operating elevation.

Frame is 1½ x 1½ x 3/16-inch angle iron; container sides and bottom are 12-gage sheet. Unit is also furnished with sides and bottom 13-15 gage, ¾ mesh expanded metal. Casters may be 4 or 5-inch semi-steel or fiber, swivel-type at one end, rigid at the other. Container is 30 x 24 x 10 inches deep; height, 34½-inch with 4-inch casters. Lower shelf attached to frame just above casters is optional.

Metal Cutting Band Saw

Heavy-duty cutting band saw, model 1220, made by Machine Tool Division, Kalamazoo Tank and Silo Co., Kalamazoo, Mich., was developed by Harley Earl Corp., Detroit industrial designers, in co-operation with Kalamazoo engineers and production men. The saw takes 12-inch rounds, and flat stock up to 12 x 20 inches. Machine is produced in two models, S and C, identical except for coolant

IRWIN
MORE FORGINGS per HAMMERBOARD DOLLAR
GRADE "A" HAMMERBOARDS
"WELDROCK" (EDGE LAMINATED) HAMMERBOARDS
RELEASE PINS
HELVES
Anything required in quantity from Pennsylvania's hard woods—maple and cherry
IRWIN 50 YEARS of Quality
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PAGE WIRE
ROUND
FLAT
OR
SHAPED
LOW CARBON
HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON
You draw the Shape
—Page can draw the Wire
—the way you want it for your production—whether it's ALL of your product, or only a part.
Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.
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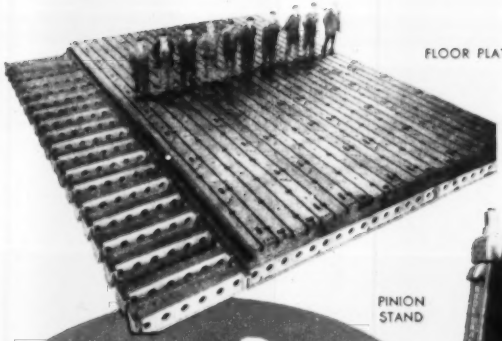
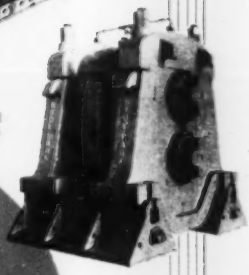
Get in touch with Page!
Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Bridgeport, Conn.
PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

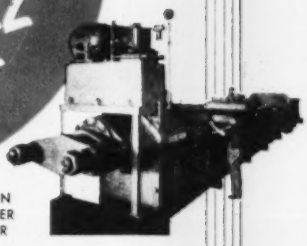


FLOOR PLATE

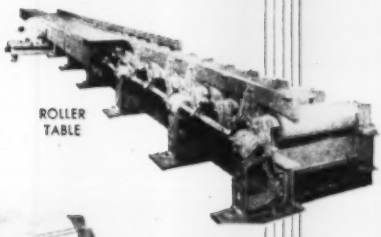


PINION STAND

Hyde Park ROLLS AND ROLLING MILL EQUIPMENT



500 TON STRETCHER LEVELLER



ROLLER TABLE

HEAVY MACHINE TOOL CASTING

FOR over fifty years Hyde Park has had the privilege of making Rolls and Rolling Mill Machinery for many of the leading mills of the nation.

Hyde Park Red Circle Rolls lead in dependable performance and long service. There is a Red Circle Roll for every purpose.

Hyde Park Rolling Mill Equipment saves maintenance costs through higher sustained efficiency.

ROLLS

- Alloy Iron
- Chilled Iron
- Sand and Chilled Iron

ROLLING MILL EQUIPMENT

- Bar Mills
- Merchant Mills
- Sheet and Strip Mills
- Pinion Stands
- Roller Tables
- Reduction Drives
- Stretcher Levellers
- Guillotine Shears
- Sheet Mill Shears
- Roll Lathes
- Special Machinery
- Machine Work

GRAY IRON CASTINGS
Up To 80,000 Lbs.

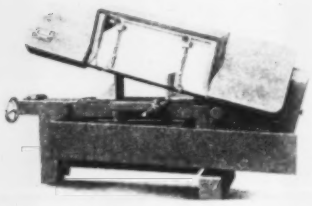
- Machinery Castings
- Lathe Beds
- Housings
- Pinion Housings
- Mill Housings
- Shoe Plate
- Lay-out Plates
- Surface Plates

RED CIRCLE Rolls ALLOY-CHILLED

HYDE PARK FOUNDRY & MACHINE CO.
HYDE PARK, WESTMORELAND CO., PA.

equipment included on the model C. It cuts to an accuracy of a few thousandths with no burr and minimum kerf.

Four cutting speeds—61, 108, 1065 and 259 fpm—are provided by a four-step cone pulley on the motor and drive shaft. This gives wider



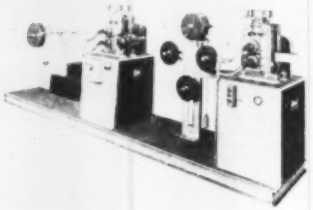
choice in matching cutting speed to material and cut size. Frame counterbalance is adjusted by a cam device that has five different spring tensions. Tripod legs assure firm setting on any floor.

Plater Has Plexiglas Cylinder

Merco portable-type plating apparatus with Plexiglas cylinder is a development of Hanson-Van Winkle-Munning Co., Matawan, N. J. Equipment is designed to process small parts efficiently, is made with cylinders 6 inches diameter by 12 inches long OD and 8 inches diameter by 18 inches long OD. Cylinder, legs and gears are of Plexiglas; motor is 1/15 hp, suitable for operation on 110 or 220 v, single phase, 60-cycle power circuit. It can be used in either acid or alkaline solutions, providing bath temperature does not exceed 180-185° F. A rheostat included makes operation of cylinder at various speeds possible.

Wire Rolling Mill

High speed, 2-stand wire rolling mill designed for flattening round and other types of wire, is offered by Stanat Mfg. Co., 47-28 37th St., Long Island City 1, N. Y. Roll size is 6 inches diameter by 4 inches face width. Mill operates on a variable voltage principle, its two motors receiving power from a single ac generator. Manually operated rheostat, placed conveniently on the second mill, accelerates and decelerates both motors simultaneously. Synchronization of motors is done by a dancer roll rheostat.



Housings are made of Meehanite. The rolls are water cooled and run on full length roller bearings with separate thrust bearings. Adjustment is done with hardened and round feed screws, that connect to the single hand wheel through worm gearing. Edging rolls run on tapered roller bearings and have a quick release handle for easy threading of the wire. Floor space occupied is approximately 5 x 15 feet.

Deep Hole Drilling Oil

For deep hole drilling and boring in metals, Conner Tool & Cutter Co., Detroit 3, Mich., introduces deep hole drilling oil. When used with a high pressure pump, it is claimed to give superior chip flushing action, constantly uniform chip formation, effective cooling of tool and work and increased production through faster metal removal and less shutdown time.

For every annealing, heating and heat treating requirement

You'll get the utmost uniformity of finished product week after week with an E F continuous production furnace. Available in chain belt, wire mesh belt, pusher tray, bulkhead tray, reciprocating, roller rail, roller hearth and other types;—gas fired—oil fired, or electrically heated, whichever suits your particular job and locality best.

Our wide experience in building batch and continuous furnaces is your assurance of high hourly outputs and low cost, trouble-free operation. Let E F engineers work with you on your next job.

Gas-Fired, Oil-Fired EF and Electric Furnaces
for any Process, Product or Production
THE ELECTRIC FURNACE CO.
WILSON ST. at PENNA. R. R. Salem - Ohio

Screwdriver and Nut Setter

Model 7500 air-powered screwdriver and nut setter, designed with a pushbutton control that provides instantaneous reverse action, is announced by Aro Equipment Corp., Bryan, O. Tool has an adjustable clutch that can be preset to correct torque requirements. Clutch jaws automatically disengage when screw is set to desired tension.

Motor Generator Set

A mono-coil high frequency motor generator set built by Electric Machinery Mfg. Co., Minneapolis, Minn., is used to convert 60 cycle current to 180 cycle and 360 cycle frequencies. These self-exciting sets are particularly useful in plants using high-cycle automatic electric hand tools.

For Office Photocopying

Redesigned for speed and accuracy in office photocopying, a Record Dexigraph camera is introduced by Remington Rand Inc., New York, N. Y. Using precut paper, it photographs documents at any reduction from 100 per cent to 50 per cent of original size on a continuous percentage scale. Up to 150 exposures in an hour may be made by synchronized operation

Where you'll find an eager ear . . . . . .

FOR YOUR SPRING STEEL PROBLEMS

FREE!

SANDVIK CATALOG DESCRIBES 785 SPRING STEEL SIZES

Write, on your letterhead, for your copy, today.

HERE'S WHY...

In spite of shortages, your Sandvik representative is still solving spring steel problems every day.

He's using his specialized knowledge to suggest close-to-perfect substitutes for out-of-stock sizes. He's supplying steel to accurate tolerances that minimize rejects. And, he is still supplying the exact answers to specific spring steel requirements from Sandvik's stock of over 800 sizes.

For spring steel with uniform physical characteristics, fine surface finish, accurate gauge and long fatigue life, check with Sandvik.

Sandvik cold-rolled, high carbon strip steels are available:

- **Precision rolled in thicknesses from .001"**
- **In straight carbon and alloy grades**
- **In special analyses for specific applications**
- **Annealed, unannealed or hardened and tempered**
- **In a wide range of widths**
- **Unpolished or polished bright, yellow or blue**
- **With square, round or treated edges**

Phone, write or wire your nearest Sandvik office for further information or technical help.

SANDVIK STEEL, INC., 111 EIGHTH AVENUE, NEW YORK 11, N. Y.

WAtkins 9-7180

230 N. Michigan Ave., Chicago 1, Ill., FRanklin 2-5638
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SANDVIK CANADIAN LTD., 426 McGill St., Mont., Can.

SS-73

The sun comes up . . .

and just as inevitably you will switch to the use of MOLYBDENUM High Speed Steel

It is readily available from manufacturers and warehouses. Tools made from it give service as good as or even better than the tungsten type of steel—most of the high speed steel used by leading tool manufacturers is the Molybdenum type.

You can save money by changing, and above all, you will help to conserve tungsten for uses for which it is really needed.

The facts you need are in this FREE BOOKLET

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Please send your FREE BOOKLET
"MOLYBDENUM HIGH SPEED STEELS"

Name .....
Position .....
Company .....
Address .....

S-10 HS-10

of an electric timer and solenoid shutter. Unit may be used with the company's Plastiphotor to make plates for offset duplicating.

One-Hand Operated Extinguisher

Redi-Grip pressurized portable fire extinguisher, available from Stop-Fire Inc., Brooklyn 1, N. Y., features one-hand operation. It is made in 1, $2\frac{1}{2}$ and 4-quart sizes and has a combination of charges: Chlorobromomethane or carbon tetrachloride, individually or in combination and expellent may be air or carbon dioxide. A patented safety lock prevents accidental discharge.

Electric Etcher

Taylor-Hobson Javelin etcher, distributed by Engis Equipment Co., Chicago, Ill., handles up to 15 workpieces at one time. It etches hard or soft metals, flat or curved surfaces with identifying numbers, names, trademarks or designs.

Bench-Type Parts Cleaner

Brush-Flush, a bench-type parts cleaner with fountain brush action is available from Graymills Corp., Evanston, Ill. It features a hollow handle brush attached to pump with a tube to produce a steady flow of clear solvent at the end of the bristles. Oil grease and dirt are flushed away as they are loosened with the brush.

Interval Timers

Tork Clock Co. Inc., Mt. Vernon, N. Y., has revised its line of single-set-timers. They are available for permanent installation or for portable use with cord and plug. Portable plug-in models are rated 6 or 15 amp. Timing interval is set by turning indicator knob on plainly marked dial.

Drill Grinder

A drill grinder for two-lip twist drills from No. 70 to $\frac{1}{4}$-inch, straight or tapered shank, is offered by Dumore Co., Racine, Wis. With this tool the user can quickly obtain any included angle of drill point from 90 to 160 degrees and any clearance angle from 5 to 15 degrees.

Snap-Action Switches

Two standard model snap-action switches are offered by Cherry-Channer Corp., Highland Park, Ill. They feature over-center coil spring construction that permits a wide range of actuating pressures by specifying spring element of proper characteristics for any job. Standard model 200 has a release force of 5.5 ounces and requires an operating force of 7.5 ounces; model 2001, release force 2.7 ounces requiring an operating force of 4 ounces.

Temperature Indicating Paint

Tempil Corp., New York 11, N. Y., offers Thermindex temperature indicating paint for research and development work. Paints are available in 16 basic shades which undergo color changes at predetermined temperatures. Many exhibit successive color transformation at several temperature levels.

Laminated Foil Cloth

Ray-Foil, a flexible, protective cloth offered by Safety First Supply Co., Pittsburgh 19, Pa., protects personnel and equipment from high radiant heat and other high temperatures. It can be used as a curtain or drape, a shield to be carried, a heat or glare baffle, or as a stand shield with a portable fire-resistant canvas wire shield.

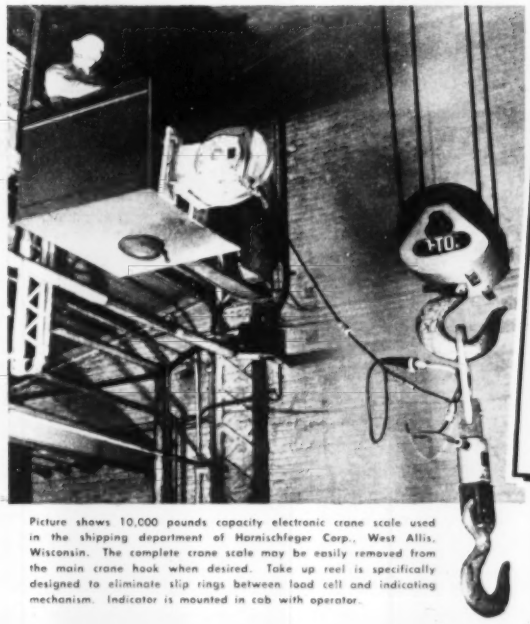
Cleans, Dries Air Lines

Vi-Speed air drier, announced by Van Products Co., Erie, Pa., removes moisture, oil, dust, dirt, smoke and scale from compressed air and gases. It reduces humidity below condensation point and acts as a storage tank. It is self-cleaning, self-regulating and fully automatic.

Automatic Duplicating Machine

Duplicator D-270, announced by Rex-Rotary Distributing Corp., New York 1, N. Y., features a completely automatic premeasured inking system. An ink cartridge is inserted, a dial set for the degree of inking and the machine needs no further attention. All copies come out perfectly and uniformly printed. A bell rings when the ink cartridge is empty. A new one is easily inserted.

FOR MORE INFORMATION
on the new products and equipment in this section write to Readers' Service Dept., STEEL, Penton Bldg., Cleveland 13, O. Your request will receive prompt attention.



Picture shows 10,000 pounds capacity electronic crane scale used in the shipping department of Harnischfeger Corp., West Allis, Wisconsin. The complete crane scale may be easily removed from the main crane hook when desired. Take up reel is specifically designed to eliminate slip rings between load cell and indicating mechanism. Indicator is mounted in cab with operator.

Announcing the

AMETRON ELECTRONIC SCALE

THE WAY TO WEIGH

Write for illustrated booklet "The Way to Weigh"

A simpler, easier, quicker way to weigh. Records while it weighs—on tape, ticket or ledger. Records by remote control in the front office what is weighed in the shipping department. A new way to keep track of production and speed up the output. Easy to install any place in the factory, yards or road. Compact, light in weight, economical to operate. The result of years of study by the Baldwin-Lima-Hamilton Corporation and the Streeter-Amet Company.

THE STANDARD OF ACCURACY · THE WAY TO WEIGH · SINCE 1888

STREETER-AMET COMPANY

4101 RAVENSWOOD AVENUE **CHICAGO 13, ILLINOIS**

Branches in Pittsburgh, Pa. and Birmingham, Ala.

MAY-FRAN

HINGED-STEEL BELT...

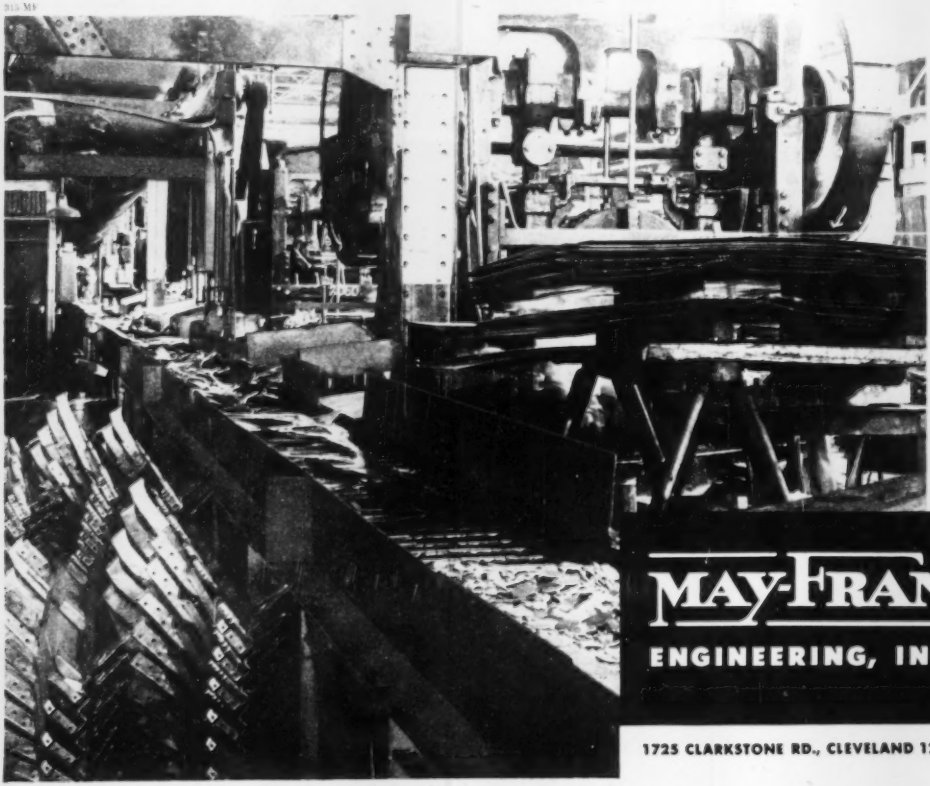
. . . mechanizes removal of highly destructive sharp-edged cut scrap from a line of punch presses. Assembled from heavy-gauge hinged-steel links, this sturdy belt withstands the extreme wear caused by sheet steel scrap which rapidly disintegrates ordinary belting.

Precision formed, heavy-gauge hinged-steel links are assembled with high-carbon rods. Side chains become an integral part of the belt. Outside links incorporate interlocking wings which remain positively engaged at all times. Special link and rod design, in conjunction with side wings, eliminates fall-through of materials handled.

MAY-FRAN hinged-steel belting can be assembled from stocked component parts in widths from 6 inches to 6 feet and in almost any length to meet specific requirements. It is available in 2½, 4, 6, 9 and 12-inch pitch length sizes with links solid or perforated to permit the passage of coolants.

WRITE FOR CATALOG

MAY-FRAN hinged-steel belt is shown removing steel scrap from a battery of punch presses in The Midland Steel Products Co. plant in Cleveland, Ohio.



MAY-FRAN
ENGINEERING, INC.

1725 CLARKSTONE RD., CLEVELAND 12, O.

The Market Outlook

DETERMINED action is being taken by NPA control authorities to clear the order log-jams in steel, aluminum and copper. Failure of tonnage cancellations to come through in anticipated volume against preliminary allotments necessitates firm action to clear books of duplicate tonnage. Many consumers, large and small, still are unable to find takers for fourth quarter CMP tickets. In steel, cancellations have not come to the mills in anything like predicted tonnage. Through speeding up the machinery for cancelling out duplications, NPA hopes to cut back sufficient orders on mill books to make way for currently stranded tickets.

CARRYOVER— Shipment arrearages from third quarter intensifies the fourth quarter log-jam. Consequently, it was not surprising when NPA last week moved drastically to clear away carryovers. It ordered all unfilled third quarter orders not shipped by Oct. 7 must be charged by consumers against their fourth quarter allotments. The same cut-off date, seven days after expiration of a quarter, also is established for succeeding three month periods. Heretofore, authorized CMP orders accepted by the mills for delivery in a stated period might be filled at any subsequent time and still be charged only against the allotment of the particular period originally named. This change in practice will penalize some consumers whose third quarter shipments were delayed through no fault of their own, but rather through delays occasioned by imposition of government directives in mill schedules.

IMPACT— Extent to which duplicate tonnage will be cleared from mill books by this action is uncertain. No one knows definitely how large the duplications are. While carryovers from third quarter were substantial in the various steel products, the steel mills have no way of determining to what extent any customer's tonnage is a duplication. In this connection, it is significant that cancellations still are the responsibility of the consumers, not the mills. Generally, impact of the order will vary from product to product, and from district to district. In some items, the mills may find themselves with open space in rolling schedules before fourth quarter ends, space that cannot be filled easily. In other products, however, bars for example, the tonnage of unplaced fourth quarter CMP tickets is so great any gaps appearing in mill schedules due to cancellations will be quickly filled.

BOOKINGS— Steelmakers are moving cautiously in booking forward business. This applies even to first quarter tonnage. Few mills are accepting anything beyond that period except in the case of "must" defense requirements. Some of the larger users, including carbuilders, tank fabricators and structural shops, still hold unplaced CMP tickets for fourth quarter, and it seems likely the mills will concentrate on clearing up this situation before becoming firmly committed on much forward tonnage. This is especially true pending government processing of first quarter applications.

PRODUCTION— Labor difficulties and equipment breakdowns are adversely affecting semifinished and finished steel production. Last week the national ingot rate declined ½ point to 101 per cent of capacity, largely reflecting a sharp slump in Youngstown operations attributable to labor trouble. At Gary some 6000 tons of steel were lost because of a wildcat strike. Ford's blooming mill broke down last week and the company found it necessary to ship steel to the East for rolling. A number of blast furnaces currently are idle for repairs.

PRICES— Steel and related product prices hold at government freeze levels. Except for a few specialties, no change has been effected in schedules since January. Last week Mystic Iron Works, the New England producer, with approval of OPS advanced its pig iron prices $1.75 per ton. This increase is based on a government-approved formula for computing quarterly contract prices for that particular furnace. STEEL's weighted index on finished steel holds at 171.92.

NATIONAL STEELWORKS OPERATIONS

DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Oct. 6	Change	Same Week 1950	Same Week 1949
Pittsburgh	98.5	— 1*	102	3.5
Chicago	106.5	+ 1.5*	102	6
Mid-Atlantic	101	0	99	7.5
Youngstown	94	— 12	106	0
Wheeling	96.5	0	99.5	59
Cleveland	103	+ 6*	98.5	0
Buffalo	104	0	104	0
Birmingham	104	+ 2	100	4
New England	90	— 3	82	52
Cincinnati	100	— 3	99	52
St. Louis	88.5	+ 2	94	84.5
Detroit	103.5	0*	106	0
Western	103	+ 1	103	20
Estimated national rate	101	— 0.5	101.5	7.5

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 79 Production-Engineering News—p. 115

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Oct. 1 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av. = 100)	171.92	171.92	171.92	157.28	112.04
Index in cents per lb.	4.657	4.657	4.657	4.261	3.035

ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$106.32	$106.32	$106.32	$94.50	$64.45
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	48.79	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	47.72	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	49.20	28.79
Steelmaking scrap, GT	44.00	44.00	44.00	41.00	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 respresentative products during 3-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Oct. 1 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10-15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.918	3.918	3.918	3.46	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.90	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.50	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.50	2.35
Strip, H.R., Chicago	3.50	3.53	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-50	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-95	3.15
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50-4.75	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.30-5.60	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47-$50	$29.00
Basic, Valley	52.00	52.00	52.00	46-49	28.00
Basic, del. Phila.	56.61	56.61	56.61	50.39	29.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	46.50-49.50	28.50
No. 2 Fdry, Valley	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Del. Phila.	57.11	57.11	57.11	50.89	30.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	45.88	24.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	52.58	28.94
Malleable Valley	52.50	52.50	52.50	49.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50-49.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	62.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt. Pitts.	$45.00	$45.00	$45.00	$44.00	$20.00
No. 1 Heavy Melt. E. Pa.	43.50	43.50	43.50	39.00	18.75
No. 1 Heavy Melt. Chicago	43.50	43.50	43.50	40.00	18.75
No. 1 Heavy Melt. Valley	45.00	45.00	45.00	43.75	20.00
No. 1 Heavy Melt. Cleve.	44.00	44.00	44.00	43.00	19.50
No. 1 Heavy Melt. Buffalo	44.00	44.00	44.00	41.50	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	61.00	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	50.50	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	16.50	9.50
Oven, Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	14.375
Zinc, E. St. Louis	19.50	17.50	17.50	17.50	8.25
Lead, St. Louis	18.50	16.80	16.80	15.80	8.10
Tin, New York	103.00	103.00	103.00	106.00	52.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	32.00	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.37	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S8	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88‡	55.38‡	55.88‡	....
Syracuse, N.Y., del.	55.91†	56.41†	56.91†	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.06	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. I1			*57.50*	*57.50*
Fontana, Calif. K1	58.00	58.50	....	....
Geneva, Utah G1	52.00	52.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill. G4	53.00	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
Lone Star, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Nevillelsland, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKeesRocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S8	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade. † Preliminary.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.0016.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Oct. 4, 1951; cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 ....52.00

INGOTS, Alloy (NT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....56.00
Houston,Tex. S5 ....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y., B2 ..56.00
Munhall,Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ....56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 ....66.00
Canton,O. R2 ....66.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....66.00
Geneva,Utah G1 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 ..66.00
So.Duquesne,Pa. U5 ....66.00
So.SanFrancisco B3 ....85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 ....70.00
Houston,Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....72.00
Munhall,Pa. U5 ....70.00
So.Chicago R2,U5,W14 ..70.00
So.Duquesne,Pa. U5 ....70.00
Struthers,O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif., K1 ....103.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago, Ill. R2 ....82.00
So.Duquesne,Pa. U5 ....82.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown, R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 ....4.40
AlabamaCity,Ala. R2 ....4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
LosAngeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.20
No.Tonawanda,N.Y.B11 ..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 ....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ....4.20
Sterling,Ill.(11) N15 ....4.45
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah G1 ....3.65
Houston,Tex. S5 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....6.25
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.30
So.Chicago,Ill. U5,W14 ..3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah G1 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 ....6.05
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ....3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Bethehem,Pa. B2 ....5.50
Lackawanna,N.Y. B2 ....5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala., T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 ....5.65
Geneva,Utah G1 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 ....5.65
Youngstown Y1 ....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Clairton,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..5.05
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
Sharon,Pa. S3 ....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ..4.75
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ..3.95
Ashland,l.c.l.(15) A10 ..4.45
Cleveland,c.l. R2 ....4.30
Warren,O.c.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky. (15) A10 ..3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ..4.15
Fairfield,Ala. T2 ....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 ....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah, G1 ....3.70
Harrisburg,Pa. C5 ....6.75
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 ....3.70
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.95
So.Chicago,Ill. U5, W14 3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1 3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva, Utah G1 ....4.85

PLATES Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill. L1 ....4.15
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 ....3.70
KansasCity, Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.00
N.Tonawanda,N.Y. B11 3.70
Pittsburgh,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
So.Chicago R2,U5,W14 ..3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Niles,Calif. P1 ....5.05
Portland,Oreg. O4 ....4.65
SanFrancisco S7 ....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 ....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Detroit R7 ....4.45
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston,Tex. S5 ....4.70
Ind.Harbor,Ind. I-2, Y1 4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ....4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Chicago R2,U5,W14 ..4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary,Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind Y1 ..6.05
Johnstown,Pa. B2 ....5.55
Lackawanna,N.Y. B2 ....5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.50
Struthers, O. Y1 ....6.05
Youngstown U5 ....5.55

BARS,Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 4.55
Buffalo B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark, Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay, Wis. F7 ....4.55
Hammond,Ind. L2, M13 ..4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca, Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass C14 ....5.10
St. Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3 ..5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 ..5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2,R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.75
Franklin,Pa.(3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ..4.85
Huntngtn,W.Va.(3) W7 ..5.50
Marion,O.(3) P11 ....4.75
Moline,Ill.(3) R2 ....4.80
Tonawanda(3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ....13.50
Dover,(Wrgt.Iron) U1 12.25
Economy,Pa.(S.R.) B14 9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt) L5 14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.50
Niles,Calif. P1 ....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
So. Chicago,Ill. R2 ....3.70
So. Duquesne,Pa. U5 ....3.70
So.SanFrancisco B3 ....4.45
SparrowsPoint,Md. B2 ....3.70
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Youngstown, R2, U5 ....3.70

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown,¼-1" B2 ....4.75
LosAngeles B3 ....5.45
Marion,O. P11 ....5.00
Seattle B3, N14 ....5.55
So.SanFrancisco B3 ....5.45
SparrowsPt.,¼-1" B2 ....4.75
Williamsport, Pa. S19 ..5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..3.60
Ashland,Ky.(8) A10 ....3.60
Butler,Pa. A10 ....3.60
Cleveland J5, R2 ....3.60
Conshohocken,Pa. A3 ....4.00
Detroit M1 ....4.40
Ecorse,Mich.(8) G5 ....3.80
Fairfield,Ala. T2 ....3.60
Fontana,Calif. K1 ....4.55
Gary,Ind. U5 ....3.60
GenevaUtah G1 ....3.70
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1..3.60
Irvin,Pa. U5 ....3.60
Lackawanna,N.Y. B2 ....3.60
Munhall,Pa. U5 ....3.60
Niles,O. N12 ....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 ....3.60
Sharon,Pa. S3 ....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ....3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 ....3.60
Weirton,W.Va. W6 ....3.60
West Leechburg,Pa. A4 ..3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ....4.75
Dover,O. R1 ....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 ....5.65
Niles,O. N12 ....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R., (14-ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 ....5.40
Conshohocken,Pa. A3 ....5.65
Ecorse,Mich. G5 ....5.95
Fairfield,Ala. T2 ....5.40
Fontana,Calif. K1 ....6.35
Gary,Ind. U5 ....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1 ..5.90
Irvin,Pa. U5 ....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 ....5.40
Sharon,Pa. S3 ....5.40
So.Chicago,Ill. U5 ....5.40
SparrowsPoint (36) B2 ..5.40
Warren,O. R2 ....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 ....5.40
Youngstown Y1 ....5.90

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 ....6.55
Ecorse,Mich. G5 ....7.10
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.55
IndianaHarbor,Ind. Y1 ..7.05
IndianaHarbor,Ind. I-2 ..6.55
Irvin,Pa. U5 ....6.55
Lackawanna(38) B2 ....6.55
Pittsburgh J5 ....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 ....6.55
Weirton,W. Va. W6 ....6.90
Youngstown Y1 ....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W. Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb. Coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgprt.Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn.Conn.(10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled High-strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.50
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(24) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.00
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.50
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt.Conn.(10) S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn.Conn.(10) S15	10.75
Pawtucket,R.I.(11) NS	10.75
Pawtucket,R.I.(12) NS	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown C8	10.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. B3	6.00
Pawtucket,R.I.(21) NS	5.85
Riverdale,Ill.(40) A1	5.60
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bered,O. C7		6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1			7.70	9.65	
Carnegie,Pa. S18		6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65		
Detroit D2	5.60	6.65	7.25		
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18			7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35		
NewYork W3		7.10	7.70	9.65	11.95
Pawtucket,R.I. NS:					
Cleve.orPitts.Base		6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5		7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8		6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5			10.30	12.50	15.35
Harrison,N.J. C18			10.30	12.50	15.35
NewYork W3			10.30	12.50	15.35

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R. (22 Ga.) COILS (Cut Lengths 1/2c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/2c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div.
C6 Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Fifth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10 ... 3.75
Warren,O. R2 ... 4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 ... 5.25

TIGHT COOPERAGE HOOP

Atlanta A11 ... 4.05
Riverdale,Ill. A1 ... 3.90
Sharon,Pa. S3 ... 4.15
Youngstown U5 ... 3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy.Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.,Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago,Ill. R2	5.70	5.95
So.S.Fran C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE (16 gage)

	Stone	
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfordsville M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.25	12.25
Waukegan A7	10.25	12.15

ROPE WIRE

	(A)	(B)
Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.55	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.55	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.55	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mdd Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ... 4.85
Aliquippa,Pa. J5 ... 4.85
Atlanta A11 ... 5.10
Alton,Ill. L1 ... 5.05
Bartonville,Ill.(1) K4 ... 4.85
Buffalo W12 ... 4.85
Chicago W5 ... 5.10
Cleveland A7, C20 ... 4.85
Crawfordsville,Ind. M8 ... 5.10
Donora,Pa. A7 ... 4.85
Duluth,Pa. A7 ... 4.85
Fairfield,Ala. T2 ... 4.85
Fostoria,O.(24) S1 ... 5.35
Houston S5 ... 5.25
Johnstown,Pa. B2 ... 4.85
Joliet,Ill. A7 ... 4.85
KansasCity,Mo. S5 ... 5.45
Kokomo,Ind. C16 ... 4.95
LosAngeles B3 ... 5.80
Minnequa,Colo. C10 ... 5.10
Monessen,Pa. P7 ... 5.10
Newark, 6-8 ga. I-1 ... 5.50
No.Tonawanda B11 ... 4.85
Palmer,Mass. W12 ... 5.15
Pittsburg,Calif. C11 ... 5.80
Portsmouth,O. P12 ... 5.25
Rankin,Pa. A7 ... 4.85
So.Chicago,Ill. R2 ... 4.85
So.SanFrancisco C10 ... 5.80
SparrowsPoint,Md. B2 ... 4.95
Sterling,Ill.(1) N15 ... 4.85
Struthers,O. Y1 ... 4.85
Torrance,Calif. C11 ... 5.80
Waukegan,Ill. A7 ... 4.85
Worcester,Mass. A7, T6 5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 ... 6.20
Buffalo W12 ... 6.35
Cleveland A7 ... 5.85
Crawfordsville,Ind. M8 ... 6.20
Detroit D2 ... 6.20
Dover,O. G6 ... 6.20
Fostoria,O. S1 ... 6.00
Kokomo,Ind. C16 ... 5.70
FranklinPark,Ill. T6 ... 6.20
Massillon,O. R8 ... 5.85
Monessen,Pa. P16 ... 5.85
Monessen,Pa. P7 ... 6.10
NewHaven,Conn. D2 ... 6.50
Pawtucket,R.I.(12) N8 ... 6.85
Trenton,N.J. R5 ... 6.15
Worcester A7 ... 6.15
Worcester T6 ... 6.50
Worcester W12 ... 6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4 ... 8.90
Buffalo W12 ... 8.90
Chicago W5 ... 8.90
Cleveland A7 ... 8.90
Crawfordsville,Ind. M8 ... 8.95
Fostoria,O. S1 ... 8.90
Johnstown,Pa. B2 ... 8.90
Kokomo,Ind. C16 ... 8.90
Monessen,Pa. P16 ... 8.90
Palmer,Mass. W12 ... 9.20
Portsmouth,O. P12 ... 8.90
Roebling,N.J. R5 ... 9.20
Waukegan,Ill. A7 ... 8.90
Worcester,Mass. A7, T6 .. 9.20

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 ... 8.50
Monessen,Pa. P16 ... 8.50
Roebling,N.J. R5 ... 8.80
SparrowsPoint,Md. B2 ... 8.60
Johnstown,Pa. B2 ... 8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4 ... 10.90
Monessen,Pa. P16 ... 11.40
Roebling,N.J. R5 ... 11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 ... 6.25
Alton,Ill. L1 ... 6.45
Bartonville,Ill.(1) K4 ... 6.25
Buffalo W12 ... 6.25
Cleveland A7 ... 6.25
Donora,Pa. A7 ... 6.25
Duluth A7 ... 6.25
Fostoria,O. S1 ... 6.55
Johnstown,Pa. B2 ... 6.25
LosAngeles B3 ... 7.20
Milbury,Mass.(12) N6 ... 8.05
Monessen,Pa. P7, P16 .. 6.25
Palmer,Mass. W12 ... 6.55
Pittsburg,Calif. C11 ... 7.20
Roebling,N.J. R5 ... 6.25
Portsmouth,O. P12 ... 6.25
So.Chicago,Ill. R2 ... 6.25
So.SanFrancisco C10 ... 7.20
SparrowsPoint,Md. B2 .. 6.35
Struthers,O. Y1 ... 6.25
Trenton,N.J. A7 ... 6.25
Waukegan,Ill. A7 ... 6.25
Worcester,Mass. J4 ... 6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5 ... 5.90
Alton,Ill. L1 ... 6.10
Buffalo W12 ... 5.90
Cleveland A7 ... 5.90
Donora,Pa. A7 ... 5.90
Duluth,Minn. A7 ... 5.90
Johnstown,Pa. B2 ... 5.90
LosAngeles B3 ... 6.85
Monessen,Pa. P7, P16 .. 5.90
NewHaven,Conn. A7 ... 6.20
Palmer,Mass. W12 ... 6.20
Pittsburg,Calif. C11 ... 6.85
Portsmouth,O. P12 ... 5.90
Roebling,N.J. R5 ... 6.20
So.Chicago,Ill. R2 ... 5.90
So.SanFrancisco C10 ... 6.85
SparrowsPoint,Md. B2 .. 6.00
Torrance,Calif. C11 ... 6.85
Trenton,N.J. A7 ... 6.20
Waukegan,Ill. A7 ... 5.90
Worcester,Mass. A7 ... 6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2 ... 126
Ala.City,Ala.,17-19ga.R2 213
Aliquippa,Pa.9-14½ga.J5 130
Atlanta A11 ... 133
Bartonville,Ill.(19) K4 ... 130
Crawfordsville,Ind. M8 ... 132
Donora,Pa. A7 ... 130
Duluth,Minn. A7 ... 130
Fairfield,Ala. T2 ... 130
Houston,Tex. S5 ... 144
Johnstown,Pa. B2 ... 130
Johnstown,17ga.,6" B2 .. 204
Johnstown,17ga.,4" B2 .. 207
Joliet,Ill. A7 ... 130
KansasCity,Mo. S5 ... 142
Kokomo,Ind. C16 ... 132
Minnequa,Colo. C10 ... 138
Monessen,Pa. P7 ... 135
Pittsburg,Calif. C11 ... 153
Portsmouth,O.(18) P12 .. 137
Rankin,Pa. A7 ... 130
So.Chicago,Ill. R2 ... 126
Sterling,Ill.(1) N15 ... 130

FENCE POSTS

ChicagoHts.,Ill. C2 ... 140
Duluth,Minn. A7 ... 125
Franklin,Pa. F5 ... 140
Huntington,W.Va. W7 ... 140
Johnstown,Pa. B2 ... 140
Marion,O. P11 ... 140
Minnequa,Colo. C10 ... 130
Moline,Ill. R2 ... 136
So.Chicago R2 ... 140
Tonawanda,N.Y. B12 ... 140
Williamsport,Pa. S19 ... 150

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	123
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. M8	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2 ... 6.10
Bartonville,Ill.(19) K4 ... 5.95
Crawfordsville,Ind. M8 ... 6.30
Donora,Pa. A7 ... 5.95
Duluth,Minn. A7 ... 5.95
Johnstown,Pa. B2 ... 5.95
Joliet,Ill. A7 ... 5.95
Kokomo,Ind. C16 ... 6.05
Minnequa,Colo. C10 ... 6.20
Pittsburg,Calif. C11 ... 6.90
Portsmouth,O. P12 ... 6.25
Rankin,Pa. A7 ... 5.95
So.Chicago,Ill. R2 ... 6.10
SparrowsPoint,Md. B2 ... 6.05
Sterling,Ill.(1) N15 ... 5.65
Worcester,Mass. A7 ... 6.25

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3 ... $7.35
Wheeling,W.Va. W10 ... 7.35

NAILS & STAPLES, Stock To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Cleveland A9	118
Crawfordsville,Ind. M8	125
Donora,Pa. A7	122
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Yl. 6.15
KansasCity,Mo. S5 ... 6.40
Lebanon,Pa. B2 ... 6.15
Minnequa,Colo. C10 ... 6.15
Pittsburgh J5 ... 6.15
Seattle B3 ... 6.65
So.Chicago,Ill. R2 ... 6.15
Struthers,O. Y1 ... 6.15
Youngstown R2 ... 6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5 ... 9.85
Lebanon,Pa.(32) B2 ... 9.85
Minnequa,Colo. C10 ... 9.85
Pittsburgh O3, P14 ... 9.85
Seattle B3 ... 10.35

TIE PLATES

Fairfield,Ala. T2 ... 4.50
Gary,Ind. U5 ... 4.50
Ind.Harbor,Ind. I-2 ... 4.50
Lackawanna,N.Y. B2 ... 4.50
Minnequa,Colo. C10 ... 4.50
Pittsburg,Calif. C11 ... 4.65
Seattle B3 ... 4.65
Steelton,Pa. B2 ... 4.50
Torrance,Calif. C11 ... 4.65

JOINT BARS

Bessemer,Pa. U5 ... 4.70
Fairfield,Ala. T2 ... 4.70
Ind.Harbor,Ind. I-2 ... 4.70
Joliet,Ill. U5 ... 4.70
Lackawanna,N.Y. B2 ... 4.70
Minnequa,Colo. C10 ... 4.70
Steelton,Pa. B2 ... 4.70

AXLES

Ind.Harbor,Ind. S18 ... 5.60
Johnstown,Pa. B2 ... 5.60

RAILS

	Std. No. 1	Std. No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P8 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

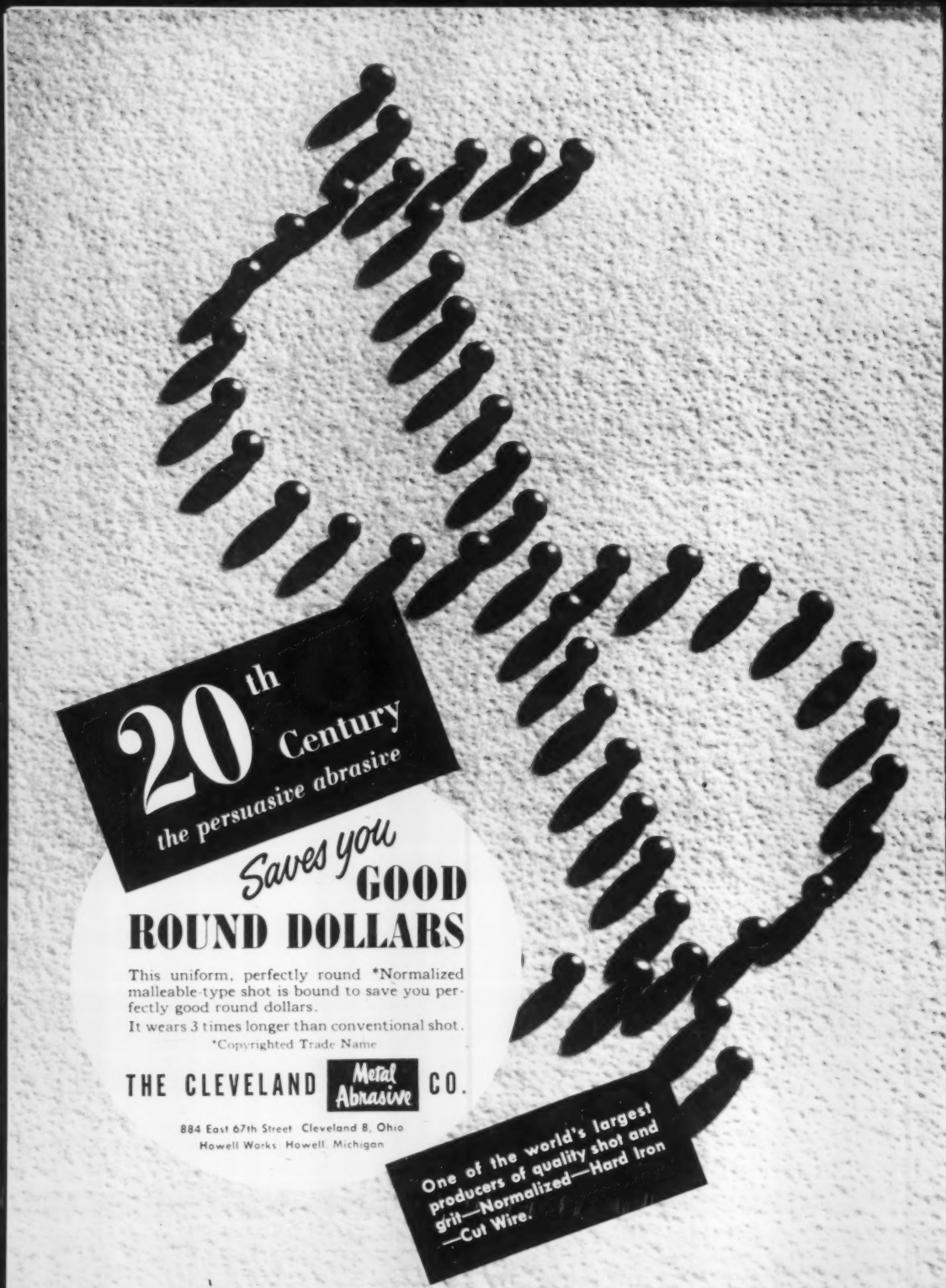
TOOL STEEL

—Grade by Analysis—

Grade	$ per lb	W	Cr	V	Co	Mo	$ per lb
Reg. Carbon	0.250	20.25	4.25	1.6	12.25	...	3.535-3.675
Extra Carbon	0.270	19	4	2	7	...	2.460
Spec. Carbon	0.325	18.25	4.25	1	4.75	...	2.125
Oil Hardening	0.350	18	4	2	9	...	2.445-2.450
5% CrHotWrk	0.350	13.5	4	3	...	...	1.604½
Hi-Carbon-Cr	0.635	6.4	4.5	1.9	...	5	0.96-0.965
18W,4Cr,1V	1.505	6	4	3	...	0	1.150
18W,4Cr,2V	1.650	1.5	4	1	...	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia, del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 26" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Spring mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 24" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.


20th Century
the persuasive abrasive
Saves you GOOD ROUND DOLLARS
This uniform, perfectly round *Normalized malleable-type shot is bound to save you perfectly good round dollars.
It wears 3 times longer than conventional shot.
*Copyrighted Trade Name
THE CLEVELAND Metal Abrasive CO.
884 East 67th Street Cleveland 8, Ohio
Howell Works Howell, Michigan
One of the world's largest producers of quality shot and grit—Normalized—Hard Iron—Cut Wire.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.18	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Following make ⅛" and larger: Lorain, O., N3; Youngstown R2 and 36⅛ % on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ⅛" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ⅛" through 3", Y1; Alton, Ill., 2 points lower discount I.1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 3½ % on ⅛", plus 2½ % on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½ % on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½ % on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	78.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1⅝	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2⅝	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding	Plates 10%	Plates 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
Stainless 302	....	....	....	....	19.75	26.24–27.50	77.00
304	25.00	29.50	....	....	24.50	27.50–27.77	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	34.00	....	....	26.00	35.92–36.50	....
317	34.50	39.00	....	....	....	....	....
318	33.50	38.00	....	....	....	....	....
321	26.50	31.00–32.00	....	....	23.00	33.00	111.00
347	27.50	32.00	....	....	24.00	33.50–33.83	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.50	45.15	41.00	54.00	....	....	....
Inconel	41.23	54.18	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. 1-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ⅝-in.	18.5
¾-in. and larger	17.5
Longer than 6 in.: All diams.	14
Lag bolts, all diams.: 6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Hvy.
½-in. & smaller	15	15
⅝-in. & ⅝-in.	12	6.5
¾-in.-1⅛-in.	9	1
1⅛-in. & larger	7.5	1
H.P. Hex.: ½-in. & smaller	26	22
⅝-in. & ⅝-in.	16.5	6.5
¾-in.-1⅛-in.	12	2
1⅛-in. & larger	8.5	2
C.P. Hex.: ½-in. & smaller	26	22
⅝-in. & ⅝-in.	23	17.5
¾-in. & 1⅛-in.	19.5	12
1⅛-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or key quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅝-in.	29.5	22
¾-in.-1⅛-in.	24	15
1⅛-in. & larger	13	8.5
½-in. & smaller	..	Light
½-in. to ⅝-in.	35	
¾-in. to 1½-in.	28.5	
	26	

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.: ⅝-in. & smaller	26
⅝-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter

	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F. o. b. midwestern plants

Structural ½-in., larger	7.85c
⅞-in. under	36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
	CARBON	
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	41.00	34.00	31.25
302...	41.25	36.50	31.50
303...	43.25	40.25	34.00
304...	43.25	38.75	33.00
309...	56.00	55.00	44.75
316...	57.00	59.00	49.25
321...	49.25	48.25	37.00
347...	53.75	52.25	41.50
410...	36.50	36.50	25.75
416...	37.00	37.00	26.25
420...	44.00	47.00	31.25
430...	39.00	31.00	26.25
501...	27.50	26.00	14.25
502...	28.50	27.00	15.25

Bait., Types 301-347 sheet, quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, except 303 and 309 E2.

Brackenridge, Pa., sheets A4 sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes on Type 301; 36.50, 302; 38.50, 304; 58.50, 316; 52.00, 347; 30.50, 410; 31.00, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 416; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 P2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & Strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 47.25c on 309 S4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309, 316 sheets 62.00, strip 64.00 W4.

Watervliet, N. Y., structurals & bars A4 quotes slight variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25 on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens	
Pure benzol	30.00-35.00
Toluol, one deg.	26.00-33.00
Industrial xylol	25.00-33.50
Per ton bulk, ovens	
Sulphate of ammonia	$32-$45
Cents per pound, ovens	
Phenol, 40 (carlots, non-returnable drums)	17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron	Cents
98+% Fe, carlots	17.00
Swedish, c.l.f. New York, in bags	8.85-9.95
Electrolytic Iron: Annealed, 99.5% Fe, 42.50 Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron: 97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum: Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper: Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese: Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh, freight allowed: 1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 65 mesh, freight allowed: 1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum: 99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

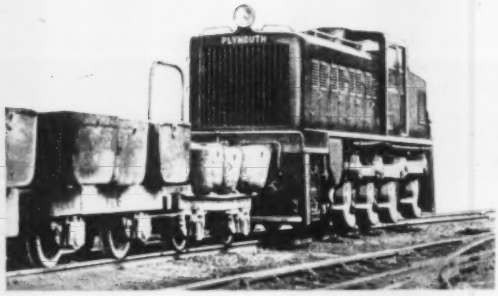
BEEHIVE OVENS

Connellsvil.fur.	$14.50-15.00
Connellsvil.fdry.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	13.20

OVEN FOUNDRY COKE

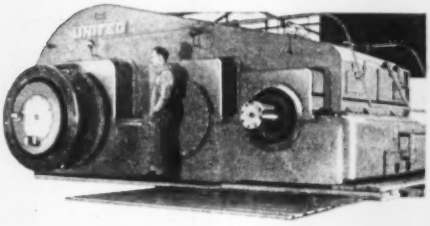
Kearny, N. J., ovens	$22.75
Everett, Mass., ovens New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.40
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.69
Philadelphia, ovens	22.70
Neville Island, Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens St. Louis, del.	25.40
Portsmouth, O., oven.	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.



SKF-equipped Plymouth Locomotive Works Flexomotive.

SKF-equipped United Engineering Company Sheet Mill.



why do so many prefer SKF?

It's pretty hard *not* to buy good bearings today, but SKF is the preferred bearing with many a manufacturer of metal mill equipment.

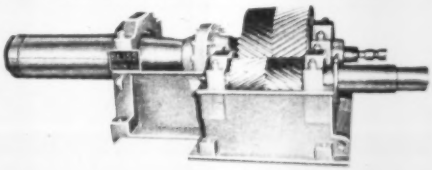
There are good reasons why!

These manufacturers know SKF as a reliable, friendly supplier. They've learned to have implicit confidence in the experienced bearing engineering specialists at SKF's headquarters. They appreciate the teamwork of SKF field men who are qualified specialists in the application of bearings to metal mill equipment.

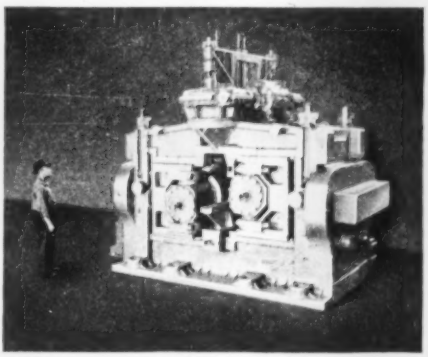
Their customers know the value of the complete maintenance service available to them through SKF's Distributor Organization.

Whatever your product, your engineers and designers can have this helpful SKF teamwork simply by asking for it.

SKF-equipped E. W. Bliss Company Tension Reel.



SKF-equipped Aetna-Standard Engineering Company Reeling Machine.



SKF
BALL AND ROLLER BEARINGS

8 REASONS WHY **SKF** IS PREFERRED BY ALL INDUSTRY

integrity • craftsmanship • metallurgy
tolerance control • surface finish
product uniformity • engineering service
field service

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.— *manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.*

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York (c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.34	...	6.24	7.00	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.80	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.95	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††§	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††§	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.85-5.95	6.90	5.55	6.49	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City (city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity (w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05‡	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85‡	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80‡	8.90‡	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60‡	9.20‡	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ²—500 to 1499 lb; ³—450 to 1499 lb; ⁴—3500 lb and over; ⁵—1000 to 1999 lb.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa., $99.60, Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

Ladle Brick

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

Malleable Bung Brick

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

Basic Brick

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite brick, $88-$93.

Magnesite

Per net ton, Chewelah, Wash. Domestic dead-burned, ⅝" grains; bulk, $36.30; single paper bags, $41.80.

Dolomite

Per net ton. Domestic burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Narlo, Clay Center, Woodville, Gibsonburg, Bettsville, O., Billmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2¼ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

NOTE: For current quotations on manganese, titanium and "other" ferroalloys, see page 151, Sept. 24 issue; for chromium, silicon, vanadium, boron, tungsten alloys, page 147, Oct. 1 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

STEELMAKING SCRAP COMPOSITE

Oct. 4	$44.00
Sept. 27	44.00
July 1951	44.00
Aug. 1950	40.00
Aug. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade) 1

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	33.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Busheling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry Steel:	
20. 2 feet and under	+ 2.00
21. 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.
(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.
(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.
(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.
(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.
(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skullings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 80% or over, $6; 75% and over, $10; less than 75%, $12.
(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats.	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches.	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	— 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	— 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.
(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.
(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1. (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes.	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery.	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.
(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.
(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
(4) For preparing into Grade No. 25, $6.
(5) For preparing into Grade No. 19, $6.
(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) For preparing into Grade No. 17 or Grade No. 21, $11.
(8) For preparing into Grade No. 18 or Grade No. 20, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
(3) For preparing into Grade No. 16, $4.
(4) For preparing into Grade No. 17, $5.
(5) For preparing into Grade No. 18, $7.
(6) For preparing into Grade No. 21, $4.
(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:
Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 43c; Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, Tex., 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 45c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, W. Va., 70c.
Youngstown, 75c.

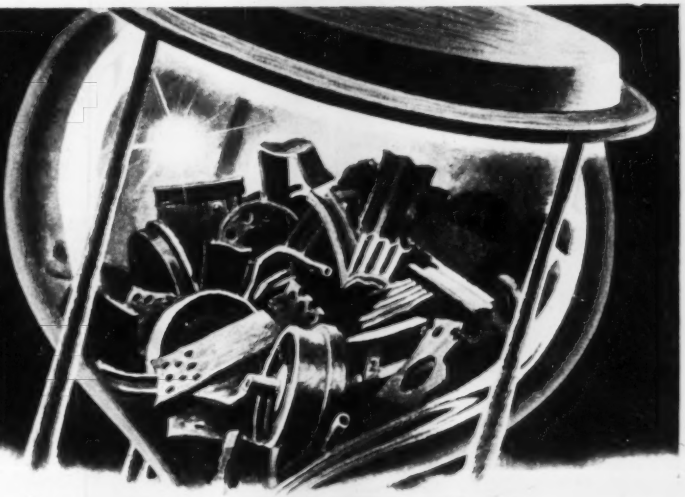
HAMILTON, ONT.

(Delivered Prices)

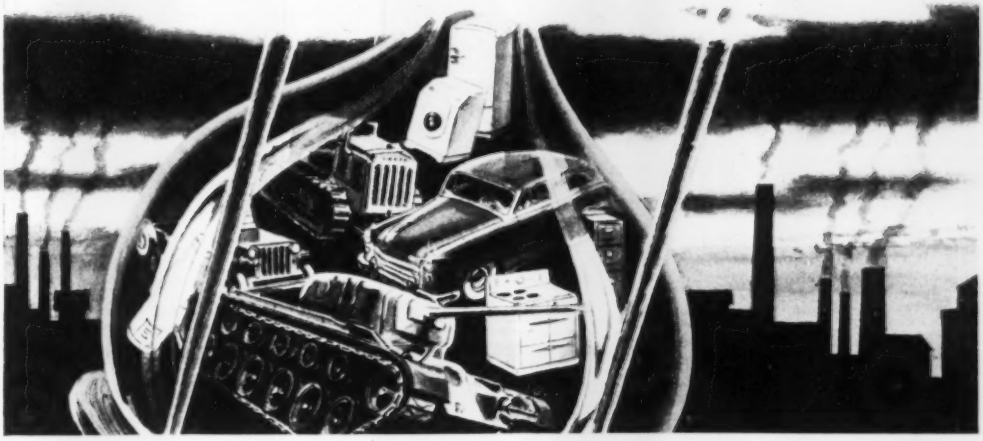
Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory, prep'd.	33.00
Bushelings new factory, unprep'd.	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast	58.00-60.00

* F.o.b. shipping point.

MAKE EVERY HOUR COUNT



KEEP SCRAP MOVING!



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LURIA BROTHERS AND COMPANY, INC.

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READING, PENNA.
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PITTSBURGH, PENNA.
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BOSTON, MASS. Statler Building
CLEVELAND, OHIO 1022 Midland Bldg.
LEBANON, PENNA. Luria Building
PUEBLO, COLORADO 334 Colorado Bldg.
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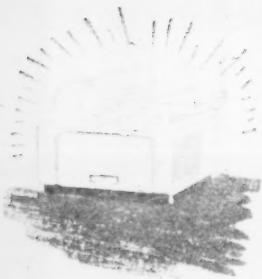
SAN FRANCISCO, CALIFORNIA 300 Montgomery St.
SEATTLE, WASH. Smith Tower

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

This man...

HELPS YOU IMPROVE YOUR PRODUCT!



New materials and better manufacturing methods contribute improvement to a product no less than new and better design. How can the manufacturer know when there is something new that applies particularly to his product or operation?

Just leave the door open and a man will call to tell all about the new things—machines, materials and methods—in modern manufacturing. Often he will bring to your attention something that is "right up your alley". It is his business to know, and he is constantly on the lookout for new things you can use.

If you don't want to wait for his call, phone him.

Responsible

"This man" is an industrial distributor or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. If he is the leading distributor, he almost certainly is the Bunting Distributor. He carries in stock for your money saving convenience Bunting Standard Stock Industrial Bearings, Electric Motor Bearings, and Precision Bronze Bars—ask him for catalog.

There are approximately 2000 Industrial Distributors serving every industrial section of the United States. In 1948 their total sales were more than $5,000,000,000. They carry an average inventory of $500,000,000, turn their stocks 5 to 6 times per year, fill 200,000 orders per day, have 12,000 outside salesmen and engineers, 10,000 inside telephone order expeditors, operate 8000 trucks delivering merchandise on which their average net profit is .0292 cents per dollar of sales.

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THE BUNTING BRASS & BRONZE CO., TOLEDO 9, OHIO

The Metal Market

Government moves to stabilize metal markets by raising lead and zinc prices, joining international copper and zinc allocation, releasing additional copper from stockpile

GOVERNMENT officials are moving swiftly to alleviate acute shortages in copper, lead and zinc. The actions taken so far will improve the overall situation but they do not surmount consumers' immediate problems of obtaining adequate supplies at reasonable prices.

OPS boosted prices of lead and zinc 2 cents a pound and fixed prices which may be paid for these imported metals at the domestic levels. Ceiling prices are 19.00c a pound, New York, for lead and 19.50c, East St. Louis, for zinc. They are on a delivered basis before payment, if any, of import tariff. The new ceilings do not apply to material in transit on Oct. 2 or purchased under a written contract made before that date, if the metal is shipped before Nov. 30 and copies of contracts are filed with OPS by Oct. 20.

Higher zinc and lead prices, while increasing costs of products fabricated from those metals, is regarded as a stabilizing factor by consumers. The increased costs probably will be passed on to users of fabricated products eventually. An increase in ceiling prices on scrap is expected to be announced soon.

Fewer Imports—Since prices for imported metal are set below present levels abroad, a slump in imports of lead and zinc are expected to result. Prices for foreign lead have been ranging from 21.50c to 22.50c a pound, Gulf ports, with the duty for account of the buyer. Principal seller of Mexican lead to consumers in this country immediately withdrew from the market pending determination of policy under the new circumstances. Foreign zinc prices have ranged upward from 29.00c, f.a.s. Gulf ports.

The government hopes substantial arrest of the inflationary trend in nonferrous metals can be achieved by accompanying allocation of world supplies with price action. Upward revisions in domestic prices were made on the basis of increased costs which have limited the possibility of developing some mines and which have retarded production at some operating properties.

U. S. Gets Half of Supplies

Copper and zinc supplies will be allocated internationally in fourth quarter. The Copper-Zinc-Lead Committee, International Materials Conference, assigned about half of supplies to the United States. Requirements of copper and zinc in the fourth quarter, as determined by the committee, exceed refinery production by about 100,000 metric tons of each metal; 15.8 per cent in the case of copper and 21.4 per cent in the case of zinc.

The United States was awarded 333,770 metric tons of the 677,160 tons of copper divided among participating consumers and 228,460 tons of the 469,260 tons of zinc. Britain was assigned the second largest amount, or 91,690 tons of copper and 60,250 tons of zinc.

Allocations represent the amount of primary metal which may be consumed by the country concerned either from domestic production or imports. Participating countries are free to purchase from and to sell to any party within the limits of their allocation.

Chile, one of the world's key sources of copper, hedged its acceptance with a condition that it be allowed to sell 20 per cent of its output "without reference to the allocation scheme." Metal again is flowing from Chilean ports, following termination of a dockworkers' strike. Chile gets 70 per cent of its U. S. dollars from this $100 million a year business.

An additional 30,000 tons of copper have been released from the government stockpile to provide metal for essential defense needs. This brings the total released to 55,000 tons.

Phelps-Dodge To Boost Output

Phelps-Dodge Corp. will step up production of copper for stockpiling and other defense needs by 38,000 tons a year. The metal will come from ore mined at the Bisbee east ore body of the corporation's Copper Queen branch at Bisbee, Ariz.

Under terms of an agreement with the government, Phelps-Dodge will undertake a $25 million expansion program which includes construction of a concentrating and leaching plant at the mine site, as well as enlargement of its smelter at Douglas, Ariz. With annual capacity of 38,000 tons, the new facilities are expected to go into production in late 1954 or early 1955.

Defense Minerals Procurement Agency will buy at 22.00c a pound up to 112,500 tons of the first 150,000 tons produced by the new facilities, providing the corporation cannot sell it to other purchasers in the United States at a higher price.

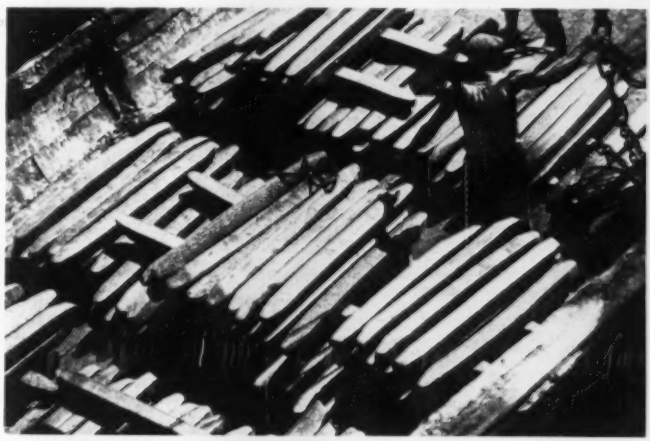
Northwest Power May Drop

Rains in the Pacific Northwest have eased temporarily the threatened power shortage. The situation remains precarious and rationing machinery has been set up in preparation for mandatory power cuts, if necessary. The aluminum industry, using normally about 36 per cent of the area's power, may have its share reduced to 24 per cent if and when it is limited to "firm" power supply.

Surplus Tin Output Forecast

A surplus of world tin production over consumption, amounting to 21,000 tons in 1951 and at least 16,000 tons in 1952, was forecast by representatives of principal tin producing and consuming countries attending the Rome conference which closed Sept. 28.

Consensus of producers was that the United States must either dip into her stockpile of an estimated 150,000 to 200,000 tons or resume purchases on the international market. American delegates gave no indication of what they believe to be a fair price for tin on the world market. Some producers mentioned $1.25 a pound. The Bolivian delegate urged an increase in price to $1.50 a pound.



CHILEAN DOCKWORKERS RESUME LOADING OF COPPER
. . . strike ends, exports move under international allocation

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c. East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb. c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 58.50c. Prices include import duty.

Mercury: Open market, spot, New York, $215-$221 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.16c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18%, 53.14; phosphor-bronze grade A, 5%, 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95%, 41.30; 90%, 40.82; red brass 85%, 39.83; 80%, 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90%, 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95%, 41.90; 90%, 41.42; red brass, 85%, 40.43; 80%, 39.96; best quality brass, 39.44.

(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.42; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60-30.60, l.c.l. 30.10-31.10, 100,000 lb lots 29.35-30.35; magnet, del., 15,000 lb or more 34.50c, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000-lb and over.

Dia. (in.) or distance across flats	Round— R317-T4, 178-T4	R317-T4	Hexagonal— 178-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.3
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 82.00c. Rods and shapes 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Oct. 2-4	24.50	18.80	19.50	103.00	19.00	42.00	56.50	90.16
Oct. 1	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Sept. Aug.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	104.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16
Feb. Avg.	24.50	16.80	17.50	182.716	19.00	42.00	50.50	90.16
Jan. Avg.	24.50	16.80	17.50	171.798	19.00	35.462	50.50	88.890

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 650 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb, 98.0c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.625
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content; for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 83 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50c; engravers' and lithographers' plates, 14.50c; die cast slabs, min. 90% zinc, 12.25c; old zinc scrap, 11.25c; forming and stamping dies, 11.25c; new die cast scrap, 10.75c; old zinc die cast radiator grills, 10.50c; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb. Used storage batteries (in boxes) drained of liquid, 6.60c for 15,000 lb or more; 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

Plates . . .

Plate Prices, Page 263

Boston — While mills are taking higher rated orders for first quarter, they are doing so cautiously pending clarification of the distribution program. While a number of tickets issued under CMP have not been reduced, some individual allotments have been cut back.

New York—Plate consumers entertain little hope of getting additional tonnage on mill books for fourth quarter. Some have CMP tickets, but cannot find a mill that will accept the business.

Pittsburgh—Extent to which plate tonnage on mill books will be wiped out to make way for unplaced fourth quarter CMP tickets is uncertain. General trade opinion is practically all third quarter carryover not shipped by Oct. 7 will be charged against fourth quarter allotments.

Sheets, Strip . . .

Sheet and Strip Prices, Page 263 & 264

Pittsburgh — Sheetmakers express surprise at the latest government regulation ordering them to charge third quarter carryover not shipped by Oct. 7 against fourth quarter allotments. This move aimed at clearing producers' books of so-called duplicate orders to make way for fourth quarter CMP tickets still unplaced, will have serious impact on the market, in the opinion of producers. Carryover from third quarter was substantial. Shipment delays were occasioned in third quarter by imposition of government directives in rolling schedules, forcing producers to push deliveries on regular accounts into the future.

Boston—Cancellations of flat-rolled steel orders, due to CMP cutbacks, are light. Consumers confronted with a slack in production are seeking to defer shipments rather than cancel orders. Cuts in allotments for first quarter are bringing orders more in line with potential supply.

New York — Sheet consumers will not know until later this month what tonnage they will be permitted to place for the first quarter. They are now permitted to place up to 70 per cent of their fourth quarter quotas and certain quantities through the third quarter of next year.

Philadelphia—While all sheet mills are accepting routine CMP orders for first quarter, as well as especially classified military needs, there is still much confusion as to how far they can go in acceptance of such orders.

Cleveland — Some adjustments in sheet order books will likely result from the latest government regulation covering quarterly carryover tonnage. Under this regulation all third quarter tonnage not shipped by Oct. 7 is to be charged by the customer against his fourth quarter allotment. To what extent this will open up space in fourth quarter schedules for unplaced CMP tickets is uncertain. The load on the mills unquestionably will be eased, however.

Youngstown—The cold-rolled strip department at the Campbell works of Youngstown Sheet & Tube Co. has been idle the past three weeks, with 500 men out of work, because of a slowdown in production at the hot strip mill.

Cincinnati—Mills are reducing output of galvanized sheets in response to orders from Washington, based on need to conserve zinc.

Chicago—Sheetmakers have received no cancellations of tonnage thus refuting contention of NPA that mill orders books contain considerable duplication of tonnage. Output of galvanized sheets and strip is still limited by short zinc supply.

Tin Plate . . .

Tin Plate Prices, Page 264

Cleveland—Arbitrary cancelling of third quarter carryover under the latest government regulation may present tin plate producers with the problem of filling gaps in their fourth quarter schedules. Unlike other major products, consumers of tin plate are limited in number and if their certified take is cut down to the extent of carryover after Oct. 7 it is problematical whetner the mills will get sufficient new tonnage to keep them fully occupied all through the period. As things now stand, customers are not standing in steel mill offices desperately seeking to place tin plate tonnage as is the case in bars, for example.

Tubular Goods . . .

Tubular Goods Prices, Page 267

Youngstown—Youngstown Sheet & Tube Co. last week closed down its No. 1 seamless tube mill at the Campbell works because of a shortage of tube rounds.

Steel Bars . . .

Bar Prices, Page 263

New York — Alloy and high-strength steel bar producers are experiencing a flurry in demand. Producers must accept for a 15-day period orders for January on a first-come-first-served basis to the extent of 10 per cent of scheduled capacity. Producers are required to set aside only 10 per cent of their output for these orders, indicating there will be a number of orders which cannot be entered. The 15-day period in which the mills have to accept carbon steel products on such a basis for January begins early in November.

Philadelphia—Bar producers are experiencing a little sample of what they expect to experience during the first 15 days of every month from now on. They are in receipt of a flurry of orders for January for alloy steels which require a 75-day leadtime. During this period, which falls prior to expiration of the lead time, producers must accept on a first-come-first-served basis CMP orders up to 10 per cent of their rated capacity for such products. Next month, and in succeeding months, there will not only be the flurry of orders for these products, but also for the heavy tonnage carbon products, which have a 45-day lead time. As the set-sides for this business are only 10 per cent, mills anticipate upon such occasions far more orders for tonnage than they can handle.

Pittsburgh—Barmakers are booking orders into first quarter cautiously. They are not inclined to take anything beyond except in the case of military tonnage. Bars are in most acute supply of the hot-rolled products in this area and there is little prospect for any early improvement with consumer pressure unrelaxed.

Cleveland—Clearing away of the third quarter carryover by arbitrary ruling of the NPA will not make even a dent in the pileup of bar orders on mill books. Bars right now are in tightest supply with customers banging at steel mill doors waiting to place fourth quarter tonnage. Consequently, any cancellations resulting from the killing off of the third quarter carryover after Oct. 7 will be quickly taken up by unplaced certified business.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 263

Boston—Buying of steel needed for construction is heaviest in reinforcing bars. Housing contracts for close to 5000 tons have been placed with several thousand additional tons to be awarded. Bulk of bridge requirements has been bought.

Structural Shapes . . .

Structural Shape Prices, Page 263

Chicago—Smaller structural fabricators are forced increasingly to rely on warehouses for shapes to complete orders under way. No improvement in structural supply is expected soon.

Boston—Fabricating shops are hard pressed to maintain schedules. Available supply of plain material is used to meet higher-rated projects, less important tonnages being extended.

New York—An increase in structural awards, involving principally bridges and industrial construction, is noted.

Pittsburgh—Restrictions on building are holding back considerable tonnage. There is little chance delayed projects will be able to proceed for months in view of the extremely tight supply position in structurals.

Semifinished Steel . . .

Semifinished Prices, Page 263

Youngstown — Steel operations dropped to about 94 per cent of capacity last week from 106 the week preceding. The drop resulted from the shut-down by Youngstown Sheet & Tube Co. of its steel plant at the Brier Hill works as a result of a long-continued work slow-down. The plant tapped out 11 open hearths a week ago and suspended the blooming mill, where workers persistently had rolled 300 tons per eight-hour turn instead of the customary 1150 tons.

Chicago—Production of 6000 tons of steel ingots was lost at Gary steelworks of U. S. Steel Co. Sept. 28-30 when 47 workers in openhearth No. 3 staged a wildcat strike over a 1-day suspension of a union member for faulty work.

Detroit—Ford Motor Co.'s blooming mill broke down at its Rouge plant. Until it's repaired, billets are being shipped to two East Coast mills for rolling.

Pittsburgh — Whitney-Apollo Steel Co. resumed operations last Monday following a week's shutdown for lack

of sheet bars. No further shutdowns are expected though the usual difficulties of nonintegrated mills in obtaining prompt semifinished supplies are anticipated.

Warehouse . . .

Warehouse Prices, Page 269

Philadelphia — Warehouses are counting on an increase in their mill quotas from the present 85 per cent of base to 100 per cent, effective Jan. 1, but believe it will be considerable time before stocks will reach any semblance of normal balance.

Pittsburgh — Demand pressure on warehouses continues strong despite slackening in consumer durable goods lines. Distributors do not anticipate a balancing in stocks until well into next year at earliest.

Los Angeles—Warehouses are reducing bookings to strike a better balance between stocks, sales and receipts.

Seattle—Warehouse executives are trying to obtain OPS approval of proposed price increases. Decreased turnover, rising overhead and higher freight rates have created a critical situation.

Pig Iron . . .

Pig Iron Prices, Page 262

Boston — Many consumers' inventories of foundry and malleable pig iron are at regulation limits, resulting in smaller shipments to these interests. This leaves more iron for less fortunate consumers and permits the district furnace to add some volume to its stockpile.

Mystic Iron Works advanced pig iron prices $1.75 a ton for fourth quarter. New level is established under mutual agreement with shops by which furnace costs are reviewed for three months earlier production excluding the last month of the previous quarter, in this case September. Foundry iron is $57, Everett, Mass.; malleable, $57.50.

New York—Pressure for pig iron is increasing. Some foundries have a heavier volume of business and many are anxious to replenish inventories. Interest in imported iron lags because of the premiums asked.

Philadelphia—Pig iron supply falls short of demand and there is talk of need for additional capacity. Recent survey indicates need for additional merchant capacity. One interest surveying the possibilities of establishing a furnace and by-products unit in the district is said to be a Canadian chemical company. Colorado Fuel & Iron Corp. is understood to have made a study of prospects for establishment of blast furnace and oven coke capacity at Claymont, Del., in connection with the steel properties it acquired there some months ago. But there are no indications of early action.

Pittsburgh — Slower demand from consumer goods lines has not resulted in any particular easing in pressure on merchant iron sellers here as foundries attempt to accumulate inventories. Expanding defense requirements coupled with increasing inquiry from consumers outside the district take up the slack.

Cleveland—Tight supply conditions in merchant pig iron in this district is forcing consumers to go outside the area for iron on an increasing scale. The merchant producer in the Pittsburgh district currently is in receipt of larger inquiry from Cleveland and vicinity largely reflecting suspension of operations at the local merchant stack of the American Steel & Wire Co. This furnace, undergoing extensive repairs, is expected to come back into production in about a month.

Chicago—For first time since mid-May all of this district's 42 blast furnaces are in operation. Foundry iron demand is not quite as strong as recently and full pig iron output will help to keep pressure eased. Two or three stacks will go down for repairs before yearend, however.

Birmingham — Sustained foundry activity over the Southeast prolongs the acute shortage of pig iron.

Iron Ore . . .

Iron Ore Prices, Page 269

Cleveland—Lake Superior iron ore shipments totaled 12,671,805 tons in September, an increase of 481,225 tons over the movement a year ago. This brought the season's total to 71,516,546 tons, an increase of 12,557,096 tons, or 21.3 per cent, over the total for the like 1950 period. Shipments are holding up well, the movement for the week ended Oct. 1 having totaled 2,830,846 tons against 2,997,873 tons for the preceding week and 2,885,462 tons for the like week a year ago, reports the Lake Superior Iron Ore Association, this city.

Scrap . . .

Scrap Prices, Page 270

Philadelphia—Inventories of scrap continue to shrink. Operations at one mill were seriously threatened last week. Despite allocations a substantial portion of available tonnage continues to leave this district at upgraded levels.

Pittsburgh—The scrap collection drive isn't far enough along to permit of conclusions as to its effectiveness. Material is flowing in somewhat better volume but mill stocks are still shrinking. Hope continues high, however, that substantial additions to stockpiles will be generated before severe weather sets in. If this doesn't happen the steelmakers say there is bound to be serious contraction in openhearth operations this winter. Indicative of mill inventories currently, local district works of U.S. Steel have only about 5 days' stocks on hand and material is being brought in from all points of the compass. Two months ago stocks were sufficient to support 15 days' steelmaking.

Detroit—Cost of removing street car tracks is the overriding reason why more of this material has not been made available. Auto wreckers are seeking relaxation in smoke ordinances so nonmetallic parts can be burnt off. Demand from foundries is still suppressed. Mills are comfortable only on blast furnace grades.

Cincinnati—Scrap supply continues inadequate to meet mill needs fully. Campaigns to get out tonnages have not penetrated some sources, collectors complain. Supplies of most grades of cast are ample.

Chicago—Scrap receipts of steel mills continue nip and tuck with consumption. Moderate increase in volume is attributed more to good fall weather than results from the scrap drives. Milwaukee yards are now handling about 15 per cent more materials than heretofore.

Birmingham—Scrap supplies continue exceedingly tight. The district's largest user is getting allocations, but only for current use.

Los Angeles—Buying of foundry grades of scrap is active as melters are more disposed to pay freight charges on remote material. Little scrap is being allocated here.

Seattle—Scrap consumers are on a day-to-day supply basis. Ceilings recently placed on material purchased in noncontiguous territory is restricting shipments from Hawaii and Alaska.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 267

Pittsburgh—Coke supplies are adequate to care for slower foundry operations. Demand pressure on merchant sellers continues light. Foundries are pacing their coke intake with receipts of pig iron.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 267

New York—Bolt and nut makers are running far behind schedules due to the shortage in bars. One leading maker is operating at 60 per cent of capacity, and has a seven months backlog; in the case of large nuts, more than 80 weeks at the present rate. Bolts are piling up at some plants.

Rails, Cars . . .

Track Material Prices, Page 263

Mt. Vernon, Ill.—Mt. Vernon Car Mfg. Division, Pressed Steel Car Co., has sufficient backlog of orders to keep the plant working at peak capacity through third quarter 1952.

Steel Imports Declining

New York—Steel imports are decreasing due to premiums, which are as much as $40 a ton over domestic mill prices, and to heavy requirements abroad.

More than 2,330,000 net tons of steel were imported in the first six months, with the trend since then downward. Most of the tonnage has been imported from Belgium, France and Luxembourg. Holland has been contributing to the flow, especially in plates, while Turkey has been shipping cold-reduced sheets. Japan is actively soliciting business in a variety of steel products. Apart from high grade alloy steels, little has been coming in from England.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

9000 tons, Washington state plant for Aluminum Co. of America, to Bethlehem Pacific Coast Steel Corp., Seattle.

3500 tons, power plant, West Penn Power Co., Pittsburgh, to Fort Pitt Bridge Works, that city.

1100 tons, kraft plant, Weyerhaeuser Timber Co., Everett, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

980 tons, plant addition, Union Carbide & Carbon Co., Portland, Oreg., to Bethlehem Steel Co.

800 tons, plant, American Can Co., Miami, Fla., to American Bridge Co., Pittsburgh.

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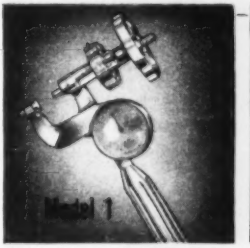

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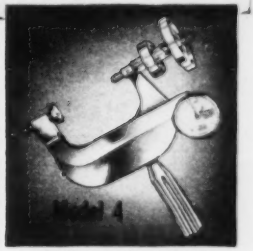

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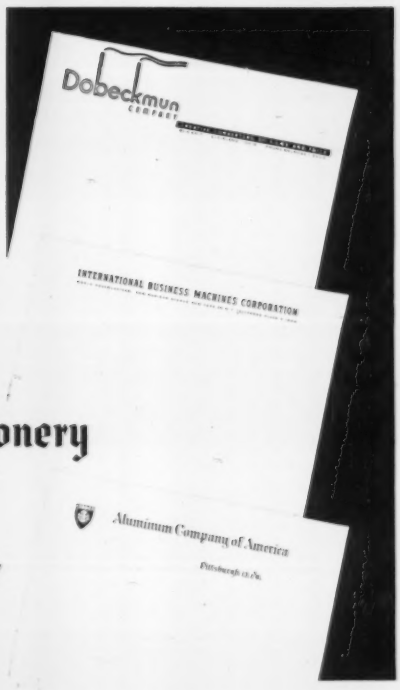

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875 tons, plant, American Can Co., Lemoyne, Pa., to American Bridge Co., Pittsburgh.

820 tons, two hospital buildings, Willard, N.Y., through P. J. Carlin, New York, to Bethlehem Steel Co.

585 tons, state bridge, Trenton, N. J., to American Bridge Co., Pittsburgh.

500 tons, jig erection plant, Boeing Airplane Co., Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

470 tons, manufacturing building, Hayden Chemical Co., Mercer county, New Jersey, to Keystone Structural Steel Co., Trenton, N. J.

455 tons, plant addition, American Smelting & Refining Co., South Plainfield, N. J., to Bethlehem Contracting Co., Bethlehem, Pa.

350 tons, plant addition, International Silver Co., Wallingford, Conn., to Topper & Griggs, Hartford, Conn.

345 tons, Lincoln Tunnel approach, Port Authority of New York, to Harris Structural Steel Co., that city.

280 tons, factory building, Sylvania Electric Products Inc., Stoneham, Mass., to West End Iron Works, Cambridge, Mass., through Thomas Worcester Inc., Boston.

220 tons, plant addition, Pitney-Bowes Inc., Stamford, Conn., to Leake & Nelson, Bridgeport, Conn.

105 tons, reclamation, Cherry Lane bridge, Mineola, L. I., to Bethlehem Steel Co.

100 tons, housing project PHA 7-3, New Bedford, Mass., to Builders' Iron Works, Somerville, Mass.; Platt Construction Co., Cambridge, general contractor; 65 tons, reinforcing to Joseph T. Ryerson & Son Inc., Cambridge.

100 tons, bridge, New York, New Haven & Hartford Railroad, Mystic, Conn., to Bethlehem Steel Co.

STRUCTURAL STEEL PENDING

1500 tons, ordnance plant, Corps of Engineers, Army, Letterkenny, Pa.; bids Oct. 23.

500 tons, two technical buildings, Hanford, Wash., Works; bids Oct. 10.

161 tons, two schedules Babcock pump plant, Columbia Basin project; first bids rejected; new bids at Ephrata, Wash., Oct. 11.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2400 tons, Elmendorf air field, Alaska, outside facilities, to Bethlehem Pacific Coast Steel Corp., Seattle; Peter Kiewit Sons Co., Seattle, general contract.

1200 tons, Alcoa's aluminum plant, Wenatchee, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

300 tons, reinforcing and structurals, housing project PHA 5-2, New Britain, Conn., to Scherer Steel Co. and City Iron Works, Hartford, Conn.; Anderson-Fairoaks Construction Co., Hartford, general contractor.

200 tons, factory building, Sylvania Electric Products Inc., Stoneham, Mass., to Concrete Steel Co., Boston; Thomas Worcester Inc., Boston, engineer-contractor.

150 tons, south end junior high school, Stratford, Conn., to Fox Steel Co., New Haven, Conn.; Harry Maring Jr. Inc., Bridgeport, Conn., general contractor; 75 tons structural steel to New England Iron Works, New Haven.

REINFORCING BARS PENDING

5000 tons, also 1400 tons shapes and 1400 tons plates, Eklutna tunnel and power plant, Palmer, Alaska; general contract to Palmer Constructors, Omaha, Nebr., on rebid $17,348,865 by Bureau of Reclamation, Denver.

140 tons, laterals and other work, Columbia Basin project; first bids rejected; new call Oct. 11 to Bureau of Reclamation, Ephrata, Wash.

PLATES . . .

PLATES PENDING

3000 tons (estimated) storage tanks and fueling systems, Fairchild air field, Spokane, Wash.; McChord air field, Tacoma, Wash. and Great Falls, Mont.; general bids in to U. S. Engineer.

PIPE . . .

CAST IRON PIPE PENDING

1000 tons, 42 to 30 inch, sewage disposal system; bids in to Portland, Oreg.

600 tons, 24 inch, system expansion, Portland, Oreg.; bids in Sept. 28.

RAILS, CARS . . .

RAILROAD CARS PLACED

Bessemer & Lake Erie, 500 seventy-ton hoppers, to Greenville Steel Car Co., Greenville, Pa.

Duluth, Mesabi & Iron Range, 250 seventy-ton hopper cars, to Mt. Vernon Car Mfg. Division, Pressed Steel Car Co., Mt. Vernon, Ill.

Norfolk & Western, 1000 seventy-ton hoppers, to Virginia Bridge & Iron Co., Roanoke, Va.

RAILS PENDING

Unstated tonnage, 1952 rail requirements, plus accessories, New York Central; bids closed Oct. 5.

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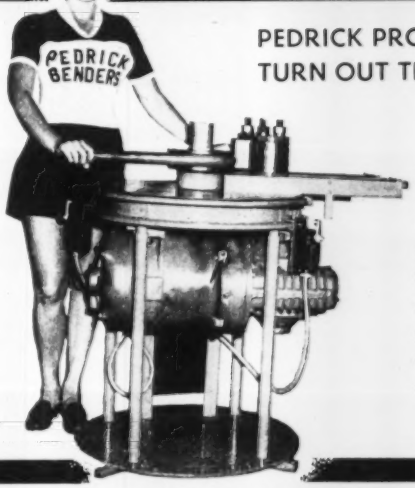

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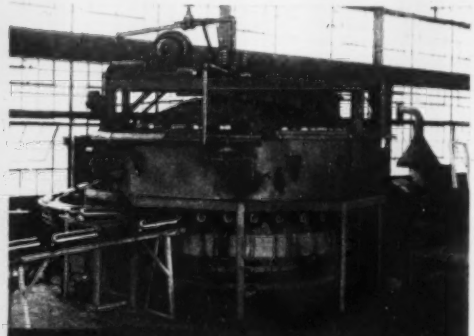

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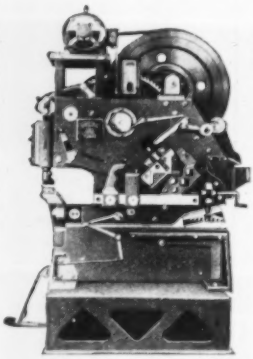

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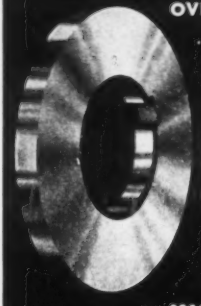

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Union Sidérurgique du Nord de la France (USINOR), largest steel enterprise on the European continent, organized a sales subsidiary, Soveda Inc. with headquarters at 20 Pine St., New York. René R. Thieren is president of the new company. Production of steel by USINOR is about 1,250,000 metric tons a year and will be increased to 1.5 million tons in 1952.

Celebrates 75th Anniversary

Hendrick Mfg. Co., Carbondale, Pa., is celebrating its 75th anniversary. The company produces thousands of sizes of perforated metal in hundreds of shapes and designs, besides manufacturing many other products, including ornamental metal grilles, open steel flooring, treads and armorgrids, and screens.

Equips Screw Machine Plant

Automatic-Screw Products Co. equipped 3500 square feet at 882 Homewood Ave., Baltimore, for production of small screw machine items. This company recently moved to Baltimore from New York. Leroy Dixon is owner.

Chevrolet Enlarging Plant

Construction has begun on the $20.8 million defense expansion at the Chevrolet plant in Tonawanda, N. Y. The plant will employ up to 3500 workers, giving Chevrolet a total employment in the Buffalo district of about 12,000.

National Broach Moves

National Broach & Machine Co., manufacturer of gear finishing and inspection machines, broaches, broaching fixtures and special production machines, moved into its new administration building at Shoemaker and St. Jean avenues, Detroit. Space formerly used for offices and engineering is being used for manufacturing.

Machinery Fair Scheduled

Interstate Machinery Co. Inc., Chicago, will hold its second annual machinery fair and open house from Nov. 14 through Nov. 17. Over 2000 new, used and rebuilt metalworking machines will be exhibited in the Interstate warehouse at 1431 W. Pershing Rd., that city. The firm's own machinery rebuilding plant will be in operation. Experienced machinery men will answer questions and give advice on various production methods and problems.

Monarch Machine Expands

Monarch Machine Tool Co., Salem, O., will make a large addition to its facilities for producing tracer-controlled automatic lathes and engine and toolmakers lathes. The new construction will expand Monarch's present plant 200 feet in length and involves the building of three additional bays, two of which will be 300 feet long.

Harig Mfg. Building Plant

Harig Mfg. Corp.—dies, jigs, fixtures, tools and special machines—,Chicago, is building a new plant at 5757 Howard St., Niles, Ill.

Morrison Steel To Expand

Morrison Steel Products Inc., Buffalo, launched a record $1,720,000 expansion program. The firm reported a $2.5 million backlog of defense orders covering ordnance and aircraft items.

Riverside Making Fuzes

Production is under way on the Army Ordnance Department $2 million contract for "workhorse" artillery fuses, awarded to Keystone Watch Case Division, Riverside Metal Co., Riverside, N. J.

Builds Iron Works Plant

A plant is being erected at 6300 Holabird Ave., Baltimore, to engage in ornamental iron works. While no name has yet been chosen to identify the project, Benni Zelubowski and Otto Schnider are partners in the enterprise.

Fire Damages Ontario Plants

A $250,000 fire damaged the Hall Foundry Co. Ltd. and the Standard Casting Mfg. Co. in Hespeler, Ont. The fire reportedly started when a spark from an acetylene torch ignited oil.

Convair Plans Design Center

Consolidated Vultee Aircraft Corp., San Diego, Calif., will construct a $3 million engineering development center at San Diego's Lindbergh Field. Facilities for design engineering in aerodynamics, hydrodynamics, hydraulics, electronics guidance research, and research and instrumentation will be provided. The new center will emphasize research and design of atomic projects, supersonic aircraft,

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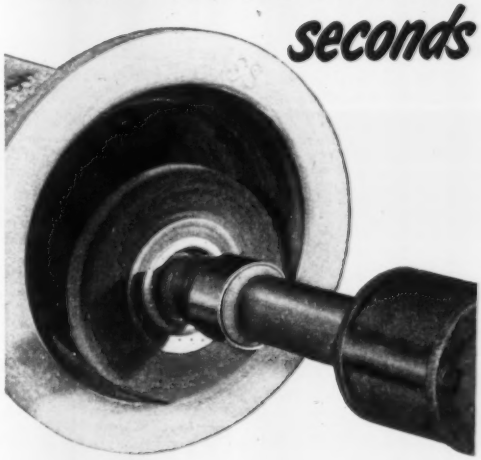

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jet bombers, flying boats, guided missiles and electronic apparatus.

Metal Products Firm Expands

Precision Metal Products Co., Plastics Division, whose plant is at the rear of 939 York Rd., Towson, Md., installed a sheet metal department, in addition to adding equipment to its plastic division.

Gorham Appoints Distributor

Gorham Tool Co., Detroit, appointed Sonnet Supply Co., Hawthorne, Calif., as its West Coast distributor. Jobbers will be appointed by Sonnet to carry the Gorham line of standard cutting tools and allied products.

District Sales Office Moved

Babcock & Wilcox Tube Co. moved its Beaver Falls, Pa., district sales headquarters to 712 Eleventh St., that city.

Laurens Enlarges Plant

Laurens Bros. Inc., dealers and rebuilders of machine tools, completed an addition to its plant at 2780 Highland Ave., Cincinnati.

Raymond Boosts Output

Production of materials handling equipment by Raymond Corp., Greene, N. Y., will be increased about 70 per cent. The company acquired a plant at Morris, N. Y., from Linn Mfg. Corp. and has begun manufacturing operations there. The company also has expanded operations at its main Greene plant.

Metal Sign Maker Expands

National Safety Engineers, Birmingham, will enlarge its plant and will install new machinery and equipment at a cost of $100,000. The company is marketing metal highway and industrial signs in each of the 48 states.

Foundry Firm Incorporated

Depew Foundry Corp. was incorporated in Buffalo. Principals are Mildred Ruth, Arlene G. Missener and Celia Tully.

Lockheed To Expand Further

Lockheed Aircraft Corp., Burbank, Calif., will construct a $12,615,000 aircraft assembly plant for the Air Force at Palmdale airport, Calif. The new facility is for final assembly and test flying of jet trainers and fighters.

Bliss Moves Chicago Office

E. W. Bliss Co., Toledo, transferred its Chicago office to 2135 S. Austin Blvd. B. E. Meyer is district manager.

Almco Establishes Branch

Almco, Albert Lea, Minn., purchased the R. F. Wuerfel Co., Detroit, former distributor for its products in Ohio, Michigan and Indiana. Mr. Wuerfel will continue in the capacity of branch manager. Research and sample processing facilities are being expanded at the Detroit branch. The company produces barrel finishing equipment, handling and separating equipment, abrasive me-

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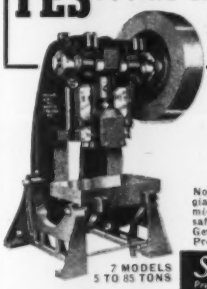

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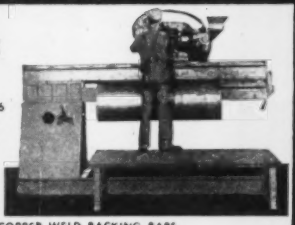

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dia and barrel finishing compound.

Canadian Can Plant Opened

American Can Co., New York, opened a new can producing plant at Chatham, Ont., its sixth in Canada. The plant covers 185,000 square feet of floor space. Initial capacity is 300,000,000 cans a year.

Machine Firm Will Move

Valley Automatic Machine Co., Endicott, N. Y., will move its facilities into a new plant to be constructed in Vestal, N. Y. The firm, owned by George Bisgrove and Robert Burtless, produces screw machine parts.

Super Tool Lists Net Prices

Super Tool Co., Detroit, issued a net price schedule, effective as of Sept. 1. This schedule lists prices of 25 types of standard solid carbide and carbide-tipped tools manufactured by the company.

MacGlashan Opens Factory

MacGlashan Air Machine Gun Co., Stanton, Calif., moved into a new factory on Chestnut St., that city.

Rheem Builds Plant in West

Rheem Mfg. Co., South Gate, Calif., is constructing an office and other buildings for manufacture of jet aircraft parts.

Thor-Canadian Plans Opening

Thor-Canadian Co. Ltd., Toronto, Ont., plans to open a new $750,000 plant in Etobicoke, Ont., in December. It will add 50,000 square feet of manufacturing space and is the first of two large buildings in a current expansion program.

Bronze Fittings Firm Moves

James Jones Co., Los Angeles, will move to 321 N. Temple City Blvd., El Monte, Calif., upon completion of a $350,000 building for manufacture of bronze valves and fittings for underground water service connections, fire protection fittings, items for gas utilities and oil lines.

Swiss Firm Appoints Agent

Lienhard & Co., La-Chaux-de-Fonds, Switzerland, manufacturer of high precision engraving machines, pantographs and similar equipment, appointed Carl Hirschmann Co., Manhasset, N. Y., their exclusive representative in the United States.

Los Angeles Offices United

American Cyanamid Co., New York, consolidated its several offices and warehouses in Los Angeles into one newly-constructed building at 2300 S. Eastern Ave. Sheldon Dahl is West Coast manager in charge of sales and manufacturing of the industrial chemicals and plastics and resins divisions, while Edward Larson is regional manager of Lederle Laboratories Division.

RESIN-BONDED: Pla-Tank, product of Chemical Corp., Springfield, Mass., is a resin-bonded plating tank. Here's the largest one it has ever molded, 24 feet deep by 3 feet in diameter. It will go to Lane Plating Works, Dallas, where it will be used for hard chrome plating the inside of working barrels for oil wells. Chemically resistant to common acids, solvents and bleaches, the light, strong material is being offered in the form of drain pipe, ventilating hoods, fabricated parts and containers

Simonski Opens New Plant

Gilbert S. Simonski Co., maker of electric furnaces, moved to its new building on Easton pike, Neshaminy, Bucks county, Pennsylvania. Anthony Lipsi is general manager.

Swartout Establishes Branch

Swartout Co., Cleveland, established a sales and service office in Houston. William A. Sharp is in charge of ventilator sales engineering and service while J. B. Downey is in charge of steam specialties sales and service. Howard T. Rieley will continue to represent the company in Texas, operating from the company's office at M & M building, Houston.

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SHOULD BE ABLE TO ANSWER THESE QUESTIONS ABOUT A MOST CRITICAL EMERGENCY IN OUR COUNTRY'S AFFAIRS

Q. Why is iron and steel *scrap* a matter of importance to me?

A. Steel for our country's military program and civilian economy is being produced at the annual rate of 107,000,000 tons in 1951 . . . 119,500,000 tons expected in 1952. Steel-making capacity is being increased now to meet those quotas.

What Do I Get For My Scrap?

In addition to being paid for your scrap, you remove nuisance inventory from your plant—saving valuable floor space. Also, you have a better chance of *getting* new steel or steel products. But, *most important*—you help alleviate a dangerous condition threatening our country's capacity to rearm and satisfy civilian requirements at the same time.

Q. How does scrap figure in the production of steel?

A. Steel is composed, generally speaking, 50% of pig iron, 25% of "production" scrap (that is, the scrap which is produced as a by-product of steel-making) and 25% of "purchased" scrap.

Q. Is scrap getting scarce?

A. Yes. The supply of *purchased* scrap is not increasing fast enough to meet the needs of increasing steel production.

Q. What if the needed scrap isn't obtained?

A. Open-hearth furnaces will not be able to operate at capacity. That will mean a loss of steel production . . . and fewer products made of steel.

Q. Why not use pig iron instead of scrap?

A. Every ton of scrap conserves approximately 2 tons of iron ore, 1 ton of coal, nearly ½ ton of limestone and many other vital natural resources—to say nothing of the extra transportation facilities that would be otherwise required.

Q. How can *more* scrap be furnished?

A. By everybody pitching in—as we always do in every emergency—and searching out all possible sources of scrap.

Q. What are these sources?

A. Metal-fabricating plants normally turn over to scrap dealers the scrap left from machining. But there's not enough of this to fill our present enormous need. So everybody—both in and out of the metal-fabricating industries—must sell scrap in the form of *idle metal*.

Every pound of idle metal is needed to keep our steel mills operating at top capacity. Sell your idle metal to a local scrap dealer right away.

What Do I Do *First*?

Write for free booklet. It tells how to set up a Scrap Salvage Program in your plant. Thousands of plants are cooperating. Do your part now! Address Advertising Council, 25 West 45th Street, New York 19, N. Y.

Q. *We* don't *produce* scrap—how can *we* help?

A. Scrap is any kind of iron and steel that's gathering dust—obsolete machines or structures, jigs and fixtures, pulleys and wheels, chains and track, valves and pipe—*anything* with rust on it or dust on it. Non-ferrous scrap is needed, too.

Q. What do we do with it when we find it?

A. Use your normal channels or get in touch with a recognized scrap dealer.

This advertisement is a contribution, in the national interest, by

STEEL

The Weekly Magazine of Metalworking

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It is not surprising that Cleveland drives installed 35 years and more ago are still in service. Units built in the early years of the Company's history continue to operate dependably today with minimum attention.

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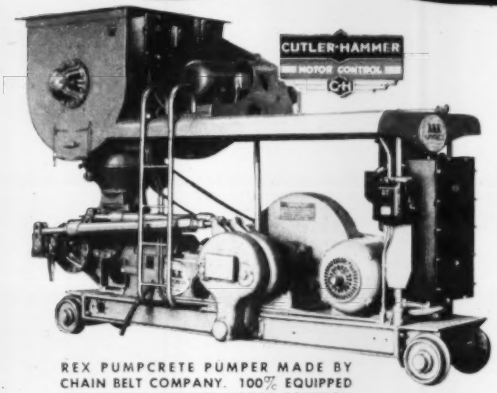

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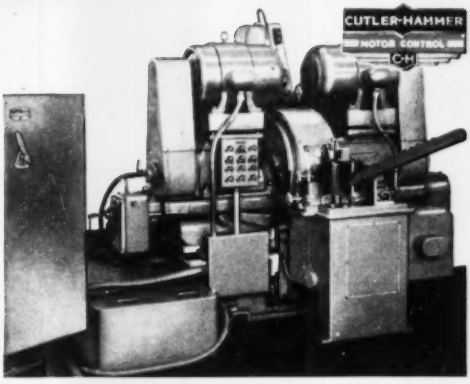

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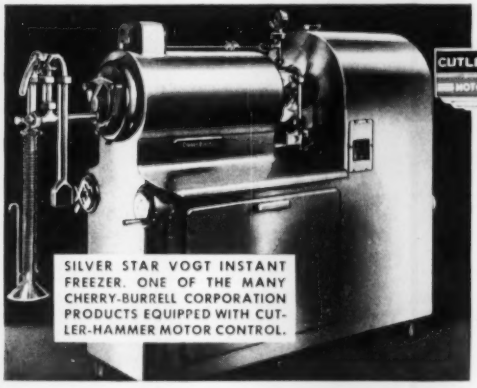

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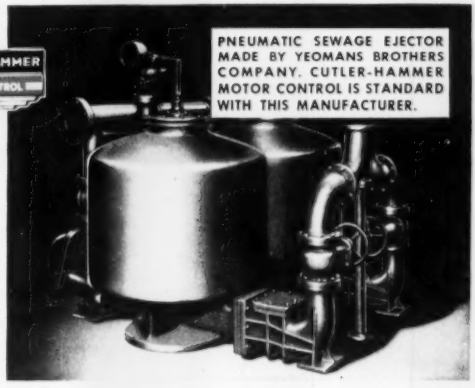

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